

Centenary of Index Medicus

1879-1979

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1879-1979

Edited by John B. Blake

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Foreword

In January 1879 the first issue of *Index Medicus* was published under the editorial direction of Dr. John Shaw Billings, Director of what was then the Library of the Surgeon General's Office, United States Army, and Dr. Robert Fletcher. Under various titles, in various formats, and with various publishers, *Index Medicus* has now continued its almost unbroken course for one hundred years. In recognition of this centenary, the National Library of Medicine, successor to the Library of the Surgeon General's Office and now solely responsible for both editorial direction and publication of *Index Medicus*, invited a group of distinguished scholars—physicians, librarians, and historians—to present a series of papers about related themes. These papers, first given at a program on May 24 and 25, 1979, are now offered to a wider audience.

The first part sets the background in medicine, publishing, and bibliography at the time *Index Medicus* was established, and describes the origin, vicissitudes, and growth of this now vigorous publication and related information systems. The second part emphasizes the role of individual physicians as bookmen—as creators, users, and supporters of books and libraries—in recognition of their contributions to a love for and an appreciation of the larger world of books and scholarship in the service of medicine.

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Director,
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Part I: Medicine and Bibliography

Between Two Worlds: American Medicine in 1879

Charles E. Rosenberg

As the 1870s drew to a close, few thoughtful Americans could have escaped the conviction that their children would inherit a world very different from their own. The United States was a nation of almost fifty million; the census of 1870 had enumerated only thirty-nine million, an increase of roughly a quarter in the decade. America was already an economic giant. Such rapid development had left an awareness of friction and conflict—the labor violence of 1877 and the panic of 1873 were still fresh in American minds—though mixed with a lingering faith in the potential of technology, of science, of growth itself. The city and factory seemed the necessary future shape of America. The great majority of Americans, however, still lived in farms and villages, thirty-six million in towns of less than twenty-five hundred.¹ The city embodied the future and a new style of life, but it was not yet the way of life followed by most Americans.

No sector of the American experience was changing more rapidly than that of learning and the communities of men who accumulated, disseminated, and applied it. The increasing complexity of social organization and elaboration of knowledge implied the creation of new careers and new modes of coping with an ever-increasing body of information.² The *Index Medicus*, on the one hand, and the career of its organizer, John Shaw Billings, represent these new realities in a particularly appropriate way. But this example was hardly atypical. The American Bar Association was organized in 1878; the Johns Hopkins University with its novel emphasis on advanced research and teaching had opened its doors two years earlier. In that same centennial year, Thomas Edison had created America's first industrial laboratory, incorporating not only his entrepreneurial skills, but the formal learning of European-trained scholars.³ The intuitive tinkerer could no longer contend unaided with the complexities of a new science-based technology.

The world of medicine too was becoming complex; medical learning had to be ordered and subdued; it was already clear that no single individual could hope to master the literature of clinical medicine, let alone those rapidly expanding biological sciences which promised to become ever more closely integrated into the practice of medicine. The

founding of the *Index Medicus* was no random event, but related precisely to a particular moment in social and intellectual history.

Despite such premonitions of innovation, American medicine in 1879 was still very much between two worlds, one of traditional medical practice and another that of the twentieth century with its new ideas, institutions, and modes of therapeutics. Like that three-quarters of the nation's population which still lived on farms and villages, medicine had in some ways changed little since the early nineteenth century. The average medical man still practiced much as he had in past generations. He saw patients in their homes or in his office and submitted bills to his "families" at leisurely intervals. He treated children and adults, delivered babies, lanced boils, and set broken bones. But the bulk of his therapeutics consisted, as it had for centuries, in the administration of drugs and the dissemination of reassuring words. He was far less likely, however, to bleed his patients than would his predecessor a half-century previously, and if he did employ a good number of traditional remedies, dosages were milder and the indications more carefully defined.⁴ He had at his disposal, moreover, a number of new drugs and modes of administering them which promised to expand his limited therapeutic repertoire. Salicylic acid, for example, with its acknowledged efficacy in acute rheumatism seemed only the most promising of a number of fever reducing drugs. (Some physicians warned, indeed, that these currently fashionable antipyretics were already being used indiscriminately and with little attention to their possible contraindications.) Electrotherapeutics too seemed of proven—if admittedly diffuse—worth in a variety of conditions. Sugar-coated pills and the hypodermic syringe promised in their different ways to ease the practitioner's therapeutic rounds. Perhaps most important, physicians in 1879 could congratulate themselves that their practice was increasingly in keeping with the body's natural tendency toward healing. As one older country practitioner contrasted therapeutic realities in his youth with those which prevailed in 1879, "The agony of a patient with a fever *then*—parched with thirst, starved with hunger, choked with crude drugs in massive doses; and his comfort *now*, present a striking contrast."⁵

But many of the physician's most efficacious remedies—opium and its derivatives, digitalis, quinine—were hardly new to the *materia medica*. Other, and by twentieth-century standards less useful, standbys of the traditional pharmacopeia still played a major role in patient care. None of these was more in evidence than the omnipresent mercury; as a salve, a purge, an "alterative," and as something of a specific in syphilis, it still played a central therapeutic role despite growing awareness of its toxicity. To ambitious young physicians, however, the most exciting new horizons beckoned in the area of surgery and the surgical specialties,

ophthalmology, gynecology, otology, and orthopedics. Diagnosis too boasted a new and seemingly scientific precision. The thermometer and the systematic recording of temperatures had become in the previous fifteen years a normal part of clinical routine; a few of the more ambitious were already seeking correlations between pulse and temperature as they sought to define the course of ancient ills with a new precision. The physician could call as well on a variety of chemical and physical tests of the urine and, of even greater novelty, the hemocytometer in making red cell counts. The stethoscope and ophthalmoscope had, again in the past two decades only, been added to the clinical equipment of physicians outside the select company of urban specialists and teachers.⁶

In some ways, however, the existence of these new therapeutic and diagnostic tools only underlined the persistence of other realities which had changed little indeed in the first century of medicine in the United States. Perhaps most important was the physician's marketplace position. Doctors still competed for a limited number of paying cases; only a handful of well-established practitioners could rely on a secure and remunerative return from practice. Access to the profession was still essentially uncontrolled and the costs of education small. Thus the continuing medical fear of "interference"—the anxiety that each fellow practitioner might be a competitor for one's patients, that consultations might provide the occasion for a clever and unscrupulous consultant to seduce away a previously loyal family. Not a few local and state medical societies had adopted or were considering the blacklisting of recalcitrant patients; those unwilling to pay their bills would have no physician to call upon. The economic pressures which faced physicians could be seen as well in repeated charges of unethical business practices, the planting of self-serving newspaper accounts of triumphant operations and unexpected cures, the endorsement by medical men of health resorts, bottled waters, and patent remedies.⁷ And physicians, of course, still contended with a host of competitors who did not even style themselves physician, the lay practitioners of a traditional domestic medicine and the pharmacists who habitually prescribed on their own.

In America's cities, where change had proceeded most rapidly, competition remained intense. General practitioners resented specialists and holders of hospital and dispensary physicianships, a hostility which informed a debate over so-called "charity abuse" that agitated a number of urban medical societies in 1879.⁸ The Medical Society of the County of New York, for example, held a particularly intense discussion centering on the way in which patients well able to pay for care were treated gratuitously at the city's numerous hospitals and dispensaries. Many staff physicians, it was charged, in their eagerness to exploit clinical material and enlarge their own institutional privileges thought little of

the economic plight which faced ordinary practitioners. New York and Philadelphia authorities on "charity organization" drew up plans to investigate and certify the "worthiness" of applicants for clinic care; many dispensaries, traditionally free, were beginning to impose a charge of ten cents a patient visit in response to such allegations of indiscriminate alms-giving. Inpatient as well as outpatient services were recipients of similar criticism. In Philadelphia, for example, critics contended that facilities were so over-abundant that the city tolerated an average of eleven hundred empty beds, the equivalent of five institutions the size of Pennsylvania Hospital.⁹

Lingering hostilities still marked relationships between sectarians—most prominently homeopaths—and regular physicians. Though both groups could at times ally themselves in resisting the pretensions of the untrained and the outright quack, there remained a good deal of sectarian antagonism as regulars charged homeopaths with therapeutic nonfeasance (or with the surreptitious practice of regular medicine) and homeopaths charged regulars with therapeutic malfeasance. Both were too frequently in competition for the same limited pool of paying patients.¹⁰

It would be a mistake, however, to overemphasize these traditional problems, for significant changes were already apparent in the institutional structure of medical practice, changes which would become increasingly important in the next two generations. If one looks not at ordinary physicians, most of whom practiced in small towns and rural areas, but at the ambitious urban elite, he can discern a pattern of medical education and practice surprisingly similar to that which was to develop in the first half of the twentieth century. It emphasized the practice of medicine in an institutional setting, specialism, systematic clinical observation, and publication. Though few pay patients (aside from the insane) were treated in a hospital setting, an increasing number of the less prosperous sought care in a hospital or dispensary. In many cases, indeed, general practitioners were happy enough to divest themselves of difficult cases with a casual referral to a convenient outpatient department; at the same time, patients began to refer themselves to such institutions. Many urban Americans had already assimilated the consumer's wisdom that it was best to seek the diagnostic skills of "the professor" or "the specialist."¹¹

The careers of ambitious young physicians were involved inextricably with these urban medical institutions: in a period without formal internships and residencies, skills and reputation in the specialties could only be acquired in the outpatient or specialized wards of hospitals and dispensaries. In every major city, moreover, the teaching of clinical medicine was centered increasingly in these institutions. In 1879 the

aspiring medical student could already find clinical opportunities in every major American city and in almost every important hospital. And to the city's workingmen and women, of course, these institutions were a necessity, despite the skepticism or fear which sometimes colored patients' expectations.

To medical men at the time, however, and to the historian in retrospect, the major institutional change in American medical practice was the inexorable spread of specialism. The pages of America's leading medical journals were filled disproportionately with the case reports, review articles, and clinical lectures of neurologists, orthopedic surgeons, ophthalmologists, laryngologists, otologists, dermatologists, and pediatricians. With the exception of the pediatricians and orthopedic surgeons, all of these specialties boasted national associations by 1879, and most had made a place for themselves on medical school faculties, if only in adjunct positions.¹² It must be recalled, however, that most specialists still felt some reservations about thus identifying themselves; at least two of the national associations, for example, forbade members to advertise themselves as exclusive specialists. (The otological and ophthalmological societies warned members that the titles "aurist" and "oculist" could not be used in public announcements.) But such scruples did little to reassure ordinary physicians, who were threatened both by the specialists' claims to particular competence and by the willingness of many specialists to continue to serve as general practitioners and thus competitors. We have already referred to the endemic hostility which separated hospital physicians—the haves—from the have-nots, those ordinary toilers in the medical fields who enjoyed neither social connection nor institutional appointment.

The American medical profession was clearly no monolith. Social origins and intellectual attainment as well as institutional affiliation divided practitioners across what might be called class lines; medical solidarity was only fitfully in evidence. Physicians regularly testified, for example, against one another at malpractice trials, competed for patients, and fought on sectarian grounds, while a less dramatic, but perhaps more significant, gap separated rural and urban practitioners. Even among specialists there were occasional differences; 1879, to cite one example, marked the height of a bitter conflict between New York neurologists and leaders in the association of asylum superintendents (predecessor of the American Psychiatric Association). Within the older and most prestigious hospitals, those grandees who occupied the positions of attending physician and surgeon were often cool to the newer specialties. And these were not the only social differentiations which marked the profession; I need only refer in passing to the fact that medicine was still essentially an occupation for white males. Though a

handful of zealous and highly motivated women might gain a medical degree at one of America's four female medical schools (or in one of the few other, on the whole less prestigious, schools which permitted coeducation), they would then have a difficult time indeed in finding clinical training; most regular medical schools would not, of course, admit blacks, nor would the American Medical Association admit black medical associations and schools to membership.¹³

Despite the often fragmented quality of the profession and the unrelenting demands of the marketplace, pressures to expand the scope of medical education increased steadily. In addition to the gradually increasing facilities for clinical education in the United States, the most ambitious and financially able sought European, and especially German, credentials. Germany had already become so fashionable that one reviewer in 1879 could note that authors would often ransack the German and English references, yet ignore equally significant work in the French literature.¹⁴ The intellectual center of medicine had shifted drastically since those ante bellum years when Paris was the goal of America's most ambitious young physicians and French the language which provided entree to the newest in medical ideas and techniques. Those physicians unable to afford the time or money to refine their clinical skills on the Continent would soon be able to attend intensive courses offered by newly organized postgraduate schools and polyclinics, finishing schools for those graduates who sought to update or expand their clinical skills. Despite a continuing rhetorical opposition to exclusive specialism as intellectually indefensible, it was clearly the road to success in urban practice.¹⁵ Medical schools, not surprisingly, vied with one another in boasting of their clinical facilities and access to hospital wards and amphitheaters. New York's College of Physicians and Surgeons, for example, offered prospective students ten outpatient clinics in its own building, access to eleven of the city's hospitals and dispensaries, as well as "personal" instruction in such clinical skills as minor surgery, physical diagnosis, normal and pathological histology, physical examination of the eye, otology, practical gynecology, and laryngoscopy and rhinoscopy.¹⁶ The more ambitious would easily find time and money to enroll in such tutorials.

Medical education was in general an area of criticism and change. The better institutions, Harvard and the University of Pennsylvania, for example, had already begun to raise standards, though the number of schools in which the aspiring and poorly endowed medical student could receive a degree remained high and the number of outright diploma mills may actually have increased in the years since the Civil War. Three rather than two courses of lectures were now offered—and in a few cases demanded—by the better institutions. Fall and spring courses were

generally available in addition to the regular five-month winter course, thus creating an option approximating a nine-month term. (Most schools began their regular winter course on or about October the first and ended at the beginning of March, though a few tolerated shorter terms and some provided longer ones.)¹⁷ In addition, the more ambitious among the student body used their summer months to seek clinical clerkships in flourishing dispensaries and hospital outpatient departments. Country medical schools were fading rapidly in significance as the city's clinical opportunities made medical education an almost exclusively urban phenomenon. Examinations too were becoming gradually more demanding. At New York's Physicians and Surgeons, only 72 of 120 applicants for the degree received it; 30 were failed and 18 conditioned. At Harvard the previous year, only 47 of 72 applicants were granted the doctorate. The University of Pennsylvania had just lengthened its course and was about to raise its entrance requirements for the 1880-81 session.¹⁸ The specialties, as we have noted previously, were making their way inexorably into the curriculum as they already had into practice and into dispensary and outpatient staffs. At Chicago's Rush Medical College, for example, chairs in dermatology and orthopedic surgery were created for the first time in 1879, while gynecology and obstetrics were divided into separate positions.¹⁹ Medical school graduates competed with increasing intensity for the limited number of hospital resident physicianships; and though it is easy to dwell on the personal and political connections which too often led to such appointments, it must be remembered that at least some were determined by competitive examination and that the number of such protointernships increased steadily.

One could, indeed, demonstrate that all of those reformist ideas that we associate with the Flexner report and medical education in the twentieth century were already being articulated by dissatisfied spokesmen for improved standards a century ago. In a "Report on Medical Education," for example, presented to the Illinois State Medical Society in 1879, its authors contended that physicians could hardly hope to improve their economic or social status without a thorough overhauling of American medical education. Higher entrance requirements, a three-year graded term, chairs endowed so that their occupants would not be dependent on the fees of matriculants and graduates, final examination by a board unconnected with the faculty—all these were needed if ever-increasing numbers of American medical men were not to clutter a marketplace already crowded with far too many ill-trained practitioners. It was this oversupply, the report urged, not some perversity among their clients, which dictated the inevitable poverty of most American physicians.

The people who inhabit the banks of the Ganges are said to rid themselves of overcrowded numbers by drowning them in its waters. Society disposes of many of the multitudinous progeny annually cast upon it from the fruitful matrices of our numerous medical schools, after short gestations and easy deliveries, by the more slow and painful process of starvation.

Most contemporaries similarly assumed a connection between the physician's market position and the system which educated him. But such material calculations were not the only motive to reform; the ideals of intellectual achievement had already been assimilated in the American medical elite. This same Illinois report which I have already cited at length also urged that the nation's medical schools "be endowed, so that their teachers might have leisure and opportunity for research, and be able to develop, as well as impart knowledge."²⁰ The pursuit of knowledge, status, and dollars seemed nicely consistent.

But such ideas were not, of course, to become the basis of a uniform policy before the twentieth century. Most American medical schools were in no position to take advantage of such admonitions and their students ill-prepared financially and intellectually for this new world of medical learning. Such realities are easily demonstrated. In the spring of 1879, a special convention of the American Medical College Association (founded only three years before) met and resolved after some debate that all its member institutions raise their entrance requirements and institute a three-year program. These brave resolves were quickly tabled, however, when the Association itself met in regular session.²¹ Most schools could simply not afford to incur such a competitive disadvantage in their never-ending search for crowded classrooms.

For the first time, at least some of the states were considering more rigid licensing. In 1879, however, Illinois was the only state which enjoyed an examination and licensing system approximating that of the twentieth century. And though still opposed by some practitioners within the state, the system did seem to be having an effect. Medical editorialists were pleased to note that after only a year of effective operation, Illinois had rid itself of roughly fifteen hundred unqualified practitioners—many of whom had moved to nearby states.²² Based on a coalition of homeopathic, eclectic, and regular support and board membership, the Illinois licensing body seemed to many physicians a model of political astuteness. But the Illinois solution was clearly atypical. In most states and most areas of potential medical policy the role of government was slight indeed.

Only in public health did there seem to be an awakening sense of state and even national responsibility. In every urban area, discussion of tenement house conditions and environmental sanitation had become commonplace, even if reform efforts proved often abortive. Following

the lead of Massachusetts in 1869, moreover, state after state had moved to create boards of health; by 1879 twenty such health boards had come into existence (though in some states that existence was fragile indeed).²³ Moreover, the most dramatic medical event of 1879 was to take place in the sphere of public medicine. In the wake of a traumatic yellow fever epidemic which had scarred the Mississippi Valley in the previous year, Congress created a precedent-making National Board of Health. Physicians were unable to agree upon yellow fever's cause and mode of transmission, but they could agree that national quarantine was a practical necessity. Though local environmental factors might play a role in fostering the disease, few medical men doubted that yellow fever was often if not invariably introduced by ships from tropical ports.²⁴ Although the National Board was to survive bureaucratic infighting and federal passivity only a half-dozen years, it did constitute a concrete recognition of the growing conviction that in some areas at least the federal government should exert a necessary and truly national authority. Yellow fever, ironically still a mystery to the world of scientific medicine, had served as a crystallizing force in encouraging public recognition of medicine's scientific claims.

Without the prestige increasingly awarded scientific ideas and techniques, public health programs would have seemed merely arbitrary. Yet here we find another area of inconsistency and change. In 1879 both the place of science in medicine generally and attitudes toward the nature and causation of disease specifically were shifting and ill defined.

Perhaps most fundamental to medical thought was the evolving complex of ideas surrounding disease. Though educated physicians had become accustomed to thinking of the most important infectious ills as specific, much confusion remained. Many physicians, for example, still found it natural to believe that one disease could transform itself into another, that undesirable environmental conditions could—of themselves—breed sickness. Sewer gas, for example, was still highly suspect as a cause of diphtheria, typhoid fever, and surgical infection. The relationship between a number of seemingly distinct ills remained unclear; the possible identity of croup and diphtheria, for example, was widely discussed in 1879, as was the existence of an elusive typhomalarial fever. Similarly, the clinical course, specificity, and sequelae of syphilis remained an area of conjecture. Especially in such constitutional ills as tuberculosis and rheumatism, physicians still emphasized questions of heredity and predisposition, and in so doing reaffirmed in appropriately modern guise the traditional categories of humoral medicine.²⁵ Physicians still clung to older holistic views of causation, etiologies based on the relationship between internal and external environment, between endowment and experience. The reductionist

assumption that a specific organism might be responsible for the manifestation of a particular disease seemed difficult to comprehend; though there was much talk of a "germ theory," it was enveloped in a remarkable amount of obscurity, and far less categorical hostility than inadequate comprehension.

It must be recalled that the constancy and variety of bacterial species was still a matter of speculation, as was the relationship between the presence of microorganisms in a suppurating lesion or disease state and their possible causative role. Only a small minority of physicians committed themselves to an all-sufficient role for bacteria in the causation of particular ills, while in most constitutional ailments it was not even a plausible explanatory option. There certainly did seem to be some "contagious principle" at work in the spread of infectious ills, but its nature remained obscure. "We can say," as the editor of New York's widely read *Medical Record* put it,

with much positiveness, to be sure, that it is no visible form of bacterium or micrococcus, and we can, perhaps, infer from analogy that it is a particulate something too small to be detected by the microscope, that it is albuminoid in composition and multiplies at the expense of physiological processes. Whether it is living or dead, whether it is the degenerated protoplasm of man or the modified protoplasm of vegetable, whether it acts in conjunction with bacteria or feeds directly upon the tissues, all these questions are much beyond the pathologist as yet.²⁶

To most physicians this was an area of academic speculation and only marginally a matter of immediate concern.

It was in surgery that the discussion of infection was most pressing. Questions of everyday procedure were necessarily involved, questions dramatically and unavoidably crystallized in the name and ideas of Joseph Lister. No surgeon could avoid taking a position in regard to Lister and antiseptis. What is surprising among American surgeons in 1879 is the comparatively small amount of opposition to what was called antiseptic surgery, though definitions, of course, varied widely. Most not only invoked Lister's name in positive terms, but adopted some version of his procedures, including the much-vexed carbolic acid spray (though few were unaware of its inconvenience and at least one New York medical man was able to demonstrate an "improved steam atomizer" which avoided some of the unpleasantness connected with Lister's crude apparatus).²⁷ Far fewer, however, understood or entirely accepted the underlying Listerian assumption that even one organism might be the cause of a possibly fatal wound infection. Some surgeons still argued that antiseptis meant nothing more than systematic cleanliness and balked at the practical difficulties implied by Lister's dressings, mode of drainage, and, of course, the carbolic spray. Many

continued to emphasize as well the importance of the patient's vitality and state of nutrition to a successful surgical outcome as well as the efficacy of particular drugs or procedures in combatting shock.

In some ways it could be argued that the acceptance of Listerism was based to an extent on an apparent consistency with certain older ideas; the spray, for example, embodied a practical and conceptual continuity with far older emphases on the role of the atmosphere in causing wound infection. (Medical men in 1879 still discussed instances in which sewer gas or ill-placed drains had contaminated a hospital's atmosphere and thus caused fevers and infections; it is not surprising that proper siting and ventilation should have been seen as remedies for such ills.) The germ theory too seemed consistent with certain older explanations of wound infection, with ideas of contamination and subsequent putrefactive change.²⁸ Perhaps the most fundamental basis for surgical interest in Lister and his doctrines lay, as I have suggested, in their relevance to everyday procedures. His views were not simply a matter for pathological speculation, but expressed themselves in specific procedures, in the choice of dressings, modes of drainage, and carbolized silk for sutures. Most of internal medicine, by contrast, could be carried on in traditional fashion. Isolating the cause of epidemic ills seemed a far less pressing need than the discovery of plausible therapeutics. And here the germ theory seemed at best potentially relevant.

It is significant, moreover, that with the exception of the role of Pasteur and early bacteriology in the formulation of Lister's own ideas, the immediate impact of the biological sciences on clinical medicine was still tenuous. Even the most intellectually exacting of the clinical journals found little place in their pages for articles on the laboratory sciences, even in the sections devoted to abstracts. The great majority of the journal literature still consisted of case reports (albeit increasingly in the specialties), essays of clinical reflection and speculation, and the transcription of clinical lectures at the nation's leading hospitals and medical schools. "Practical" and "experienced" were repeated again and again as terms of reassurance in book reviews, while "theoretical" played a symmetrically pejorative role. Even in Germany, of course, most physicians devoted themselves to clinical work and insofar as they published, did so in clinical medicine. In the United States, however, the balance of effort seemed markedly skewed toward the practical and clinical. A bibliography of publications in physiology for 1879 published by the *British Journal of Physiology*, for example, showed 59 monographs and 500 articles in German, 17 monographs and 227 articles in French—and only 2 monographs and 24 articles by American authors. If one considers the total number of articles in *Index Medicus* for that year, however, the results are quite different. Of more than 20,000

articles indexed, 4,781 were of American authorship, 4,608 French, and 4,027 German.²⁹

In the minds of many Americans, indeed, there seemed to be a fundamental inconsistency between the demands of the laboratory and those of the bedside. When eulogizing J. B. S. Jackson, the prominent Boston pathologist who died in 1879, Oliver Wendell Holmes made it clear that he felt Jackson's analytical and intellectually meticulous manner made him an unsuccessful practitioner. "He was perhaps too sensitive," Holmes explained, "and, if such a word may be ventured, too scrupulous. . . . Perhaps he knew too much; knew the tricks of nature which baffle the most skilful diagnosticians too well to speak with that positiveness which is often decisive, in virtue of its personal emphasis, in cases where doubts are plenty and convictions feeble."³⁰ The practitioner, Holmes conceded, had to act with an entire, if necessarily arbitrary, confidence—an attitude entirely unsuitable to the scientist. Holmes was obviously aware as well that few, if any, medical men could hope to live the scientist's intellectually austere life; America in 1879 would not support them.

Contemporaries, nevertheless, were well aware that they lived in an age of change, that medicine particularly was very much in transition, and that the chief agent of change would be the very science which, for the moment at least, played so marginal a role within the average physician's practice. In his eulogy of Jackson, to pursue the same example, Holmes made clear that his deceased friend's pathology was in its content already out of date; Jackson's gross pathology had already been superseded by a new generation of microscopic histologists with their research rooted in skills which the older man had never mastered.³¹

This self-conscious mood of transition is exemplified equally well in contemporary reactions to other deaths in 1879, the end of lives both real and at the same time symbolic of fundamental change in American medicine. Among such worthies were George Bacon Wood and Isaac Hays in Philadelphia, and Jacob Bigelow as well as Jackson in Boston. Born in 1796, Hays had edited the *American Journal of the Medical Sciences* for a half century; he had nurtured the fledgling journal into an internationally recognized quarterly from whose pages—as Hays's admirers contended—the medical progress of a half century could be reconstructed. George B. Wood (author of an extremely successful textbook of medicine and, with Franklin Bache, of the first comprehensive *United States Dispensatory* which, first published in 1833, had gone through six editions and sold well over one hundred thousand copies by 1879) was a prototype of the library scholar, the master of an already extensive clinical literature, but a stranger to the laboratory. No successor could hope to match Wood's synoptic knowledge of the medical

literature. By 1879 the scope of medical literature had already become too broad. Jacob Bigelow, to cite another instructive example, was also mourned in 1879. Born in 1787, Bigelow's life encompassed almost a century of ever-more-rapid medical change. Bigelow's youthful publications in botany and technology illustrate the broad intellectual interests and diffuse career patterns of early nineteenth century physicians, while his central role in attacking the traditional polypharmacy and heroic dosages of the 1820s and 1830s underlines another central development in American medicine during the middle third of the nineteenth century.³² One can, in short, cite any number of indicators of the changed, yet peculiarly transitional quality of American medicine in 1879.

Medical publishing itself is a particularly relevant indicator of change, relevant certainly to our present concerns. It is no accident that the *Index Medicus* appeared in 1879. Its existence reflected a genuine need for control of an enormously varied and daily-increasing literature. The *Index* surveyed more than five hundred journal titles and cited more than twenty thousand references. In its first issue, significantly, John Shaw Billings explained why he had dismissed the possibility of issuing this new tool as an annual; knowledge was changing too rapidly, he contended, and a legitimate demand "to bring the stock of knowledge up to the very latest date" implied a monthly format. At the same time, consistently, the American Medical Association's annual volume of *Transactions* was being criticized as excessively dilatory in appearance; "few men of reputation," as one editor put it, "will submit to such delay."³³ No previous generation of physicians experienced such a pace of intellectual work; years, not months, would have been appropriate for an index a generation previously, decades, not years, in previous centuries. Eighteen seventy-nine was perhaps a year of transition, of conceptual and institutional inconsistency and asymmetry, but the shape of future developments was already becoming clear. Certainly it already was to that extraordinarily prescient maker and recorder of history, John Shaw Billings. His very career as entrepreneur and organizer of knowledge is in itself a characteristic artifact of this new world.

Notes

1. U.S., Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition*, 2 pts., (Washington: Government Printing Office, 1976), pt. 1, pp. 8, 12, 14, 19.

2. For a recent survey of scholarship in this area, see Alexandra Oleson and John Voss, eds., *The Organization of Knowledge in Modern America, 1860-1920* (Baltimore: Johns Hopkins Press, 1979). See also Alfred D. Chandler's recent synthesis of business history, technology, and organizational structure in shaping administrative roles, *The Visible Hand: The Managerial Revolution in American Business* (Cambridge: Harvard University Press, 1977).

3. See, for a general appraisal, Thomas P. Hughes, "Edison's Method," in William B. Pickett, ed., *Technology at the Turning Point* (San Francisco: San Francisco Press, 1977), pp. 5-22.

4. For general discussions of these trends, see Charles E. Rosenberg, "The Therapeutic Revolution: Medicine, Meaning and Social Change in Nineteenth-Century America," *Perspectives in Biology and Medicine*, 20 (1977): 485-506, and John Harley Warner, "The Nature Trusting Heresy," American Physicians and the Concept of the Healing Power of Nature in the 1850's and 1860's," *Perspectives in American History*, 11 (1977-78): 291-324.

5. Samuel Peters (Cohoes, N.Y.), "Some Points in the Treatment of Typhoid Fever," *Medical Record*, 15 (May 31, 1879): 508-9. It must be emphasized, however, that despite such brave disavowals of traditional therapeutic routinism and emphasis on the body's natural powers of recuperation in most ills, the clinical literature in 1879 indicates an almost universal use of drugs (frequently in imaginative combinations) in almost every conceivable clinical situation. This generalization and many of the other observations made in the following pages are based particularly on a reading of the *Boston Medical and Surgical Journal* and *Medical Record* for 1879 (cited hereafter *BMSJ* and *MR*).

6. Published case reports and hospital records make this evident, contrasting sharply with the situation during the Civil War years. See Charles E. Rosenberg, "The Practice of Medicine in New York a Century Ago," *Bulletin of the History of Medicine*, 41 (1967): 223-53.

7. See, for example, Editorial, "Medical Certificates," *MR*, 15 (May 24, 1879): 493-94, and 15 (June 21, 1879), 578-79; "Medical Reports in the Newspapers," *ibid.*, 15 (Apr. 26, 1879): 404-5; "Collecting Doctor's Bills," *ibid.*, 16 (Oct. 4, 1879): 312.

8. For a general discussion of the dispensaries and outpatient medicine, the target of most attacks on excessive charity, see: Charles E. Rosenberg, "Social Class and Medical Care in Nineteenth-Century America: The Rise and Fall of the Dispensary," *Journal of the History of Medicine*, 29 (1974): 32-54; George Rosen, "The First Neighborhood Health Center Movement: Its Rise and Fall," *American Journal of Public Health*, 61 (1971): 1620-37.

9. "Medical Notes: New York," *BMSJ*, 100 (Mar. 20, 1879): 405; "Medical Notes: Philadelphia" and "Letter from Philadelphia," *ibid.*, 100 (Jan. 2, 1879), 34-36. The Medical Society of the County of New York meeting is reported in detail in *MR*, 15 (May 31, 1879): 524-27, and 15 (June 21, 1879): 586-88. See also related correspondence and editorials in *ibid.*, 15 (June 21, 1879): 578, and 16 (July 23, 1879): 140-41.

10. In some ways, hostility was less than monolithic, certainly in the pages of the *MR* and *BMSJ*. For representative comments, see Editorial, "The American Medical Association," *MR*, 15 (Apr. 26, 1879): 400; "The National Board of Health and Homoeopathy," *ibid.*, 15 (June 28, 1879): 621; 16 (Aug. 9, 1879): 142-43; *BMSJ*, 100 (Jan. 23, 1879): 137.

11. See the comments of H. D. Noyes, *MR*, 15 (May 31, 1879): 524-25.

12. Most of these specialty societies had been established in the 1870s, with the exception of asylum superintendents (1844), ophthalmologists (1864), and otologists (1868). For general discussions of the rise of specialization, see George Rosen, *The Specialization of Medicine, with Particular Reference to Ophthalmology* (New York: Froben Press, 1944); Rosemary Stevens, *American Medicine and the Public Interest* (New Haven: Yale University Press, 1971), pp. 34-54.

13. Mary Roth Walsh, "Doctors Wanted: No Women Need Apply": *Sexual Barriers in the Medical Profession, 1835-1975* (New Haven: Yale University Press, 1977); W. Montague Cobb, *The First Negro Medical Society: A History of the Medico-Chirurgical Society of the District of Columbia, 1884-1939* (Washington: Associated Publishers, 1939).

14. *BMSJ*, 100 (Jan. 23, 1879): 125.

15. Such formal objections to specialism hinged on the presumed inability of the exclusive specialist to deal with the body as an integrated whole.

16. College of Physicians and Surgeons, New York, *Annual Catalogue and Announcement* (New York, 1879), pp. 17–20. These offerings were more varied than most, but all urban schools provided such alluring lists of clinical facilities, although students often discovered that reality did not entirely correspond to such expansive descriptions. For a general introduction to the problem, see Dale C. Smith, "The Emergence of Organized Clinical Instruction in the Nineteenth-Century American Cities of Boston, New York and Philadelphia" (diss., University of Minnesota, 1979).

17. There was no consistency as to length of term. Those schools providing an optional third year often lowered fees for those undertaking it.

18. *MR*, 15 (June 7, 1879): 551; *BMSJ*, 100 (Mar. 13, 1879): 373.

19. *MR*, 15 (Mar. 22, 1879): 287; *BMSJ*, 100 (Mar. 20, 1879): 406–7.

20. E. Ingals et al., "Report on Medical Education," *Transactions of the Anniversary Meeting of the Illinois State Medical Society*, 29 (1879): 228–40 (quotations pp. 233 and 236). For a forceful parallel statement of this position, see Alfred Mercer, "Abstract of an Address on Medical Education," *BMSJ*, 100 (Mar. 27, 1879): 417–26. Mercer taught at Syracuse, which like its neighbor Albany had adopted the three-year term.

21. *BMSJ*, 100 (May 15, 1879): 680–81.

22. "Illinois State Examinations," *BMSJ*, 100 (Jan. 30, 1879): 164; "The Medical Practice Act in Illinois," *ibid.*, 100 (Feb. 20, 1879), 270; H. O. Johnson, "The Regulation of Medical Practice by State Boards of Health, as Exemplified by the Execution of the Law in Illinois," *Transactions of the American Medical Association*, 30 (1879): 293–98. The same volume of the *AMA Transactions* contains an extremely useful survey of the various state societies and their powers by Stanford E. Chaillé, "State Medicine and State Medical Societies," pp. 299–355.

23. Editorial, "The Growth of State Medicine," *MR*, 16 (Oct. 4, 1879): 328–29; "State Boards of Health," *ibid.*, 15 (Mar. 22, 1879): 278.

24. *BMSJ*, 100 (May 22, 1879): 715–16. The controversial literature on the cause of yellow fever and appropriate means of prevention was particularly abundant in 1878 and 1879.

25. In evaluating a monograph on gout and rheumatism, *MR*'s reviewer dismissed the author's speculative pathology by noting, "This idea cannot be considered strikingly new. Indeed, whatever be the refinements in the pathology of gout, the main idea can always be expressed broadly in the humoralistic terms of Sydenham, who says: The quitting of bodily exercise of a sudden causes the excrementitious part of the juices, which was formerly expelled by means of such exercise, to lie concealed in the vessels and feed the disease." *MR*, 16 (Aug. 2, 1879): 109. See the parallel speculations of Alfred Stillé on acute rheumatism, *ibid.*, 15 (Jan. 4, 1879): 31–32. On syphilis, see Fessenden N. Otis, "Clinical Lectures on the Physiological Pathology of Syphilis. Delivered at the College of Physicians and Surgeons, New York, Session of 1878–79," *BMSJ*, 100 (Feb. 13, 1879): 213–21, esp. 213–15.

26. Editorial, "The Prophylaxis of Scarlet Fever," *MR*, 15 (Mar. 22, 1879): 277. George Shrady, editor of *MR*, was in other moods even more skeptical in his attitude toward the germ theory. "Judging the future by the past," he chided, "we are likely to be as much ridiculed in the next century for our blind belief in the power of unseen germs, as our forefathers were for their faith in the influence of spirits, of certain planets, and the like, in inducing certain maladies." "The Causes of Disease," *MR*, 16 (Aug. 2, 1879): 107.

27. The inventor was Dr. Louis Sass. See *MR*, 15 (Apr. 5, 1879): 333; Editorial, "Mr. Lister's Antiseptic Treatment," *ibid.*, 15 (June 14, 1879): 561. Case reports in clinical surgery almost invariably note the use of "Lister's method" or some approximation of it appropriate to local circumstances. Most surgeons avoided an explicit discussion of the theoretical basis of Lister's procedures. For an atypically self-conscious defense of Lister's reasoning coupled with a flexible attitude toward his method, see Faneuil Weisse, "Antiseptic Surgery," *MR*, 15 (Mar. 22, 1879): 269–70.

28. For a more extended discussion of some aspects of this elusive question, see Charles E. Rosenberg, "Florence Nightingale on Contagion: The Hospital as Moral Universe," in idem, ed., *Healing and History: Essays for George Rosen* (New York: Neale Watson, 1979), pp. 116-36. See also Margaret Pelling, *Cholera, Fever and English Medicine 1825-1865* (Oxford: Oxford University Press, 1978).

29. John Shaw Billings, "Our Medical Literature," in Frank B. Rogers, ed., *Selected Papers of John Shaw Billings* (Baltimore: Medical Library Association, 1965), pp. 117-20. Billings, like many of his elite contemporaries in 1879, was dismayed at the generally undistinguished, if abundant, quality of American medical journals. Billings, "The Medical Journals of the United States," *BMSJ*, 100 (Jan. 2, 1879): 1-2; Editorial, "The Tidal Wave," *ibid.*, 100 (Jan. 2, 1879): 30-31; "Worthless Periodicals," *ibid.*, 100 (Feb. 27, 1879): 304-5.

30. "John Barnard Swett Jackson," *BMSJ*, 100 (Jan. 9, 1879): 63-64. It might be noted in passing that William Henry Welch was admitted to fellowship in the New York Academy of Medicine on May 1, 1879.

31. *Ibid.*, p. 64. Two other eulogists, George Cheever and H. I. Bowditch, made the same point in regard to Jackson. *BMSJ*, 100 (Feb. 6, 1879): 190-91.

32. See the memorial remarks of H. I. Bowditch at a meeting of the Boston Society for Medical Improvement, *BMSJ*, 100 (Feb. 6, 1879): 193-95, and remarks at Suffolk District Medical Society, *ibid.*, 100 (Mar. 27, 1879): 436-37.

33. *BMSJ*, 100 (May 1, 1879): 614-15. Billings's comment is to be found on p. 3 of the first number of *Index Medicus*.

The Nineteenth Century Medical Press

Genevieve Miller

In 1855 an anonymous English reviewer wrote, "Although we are indebted to America for the application of anaesthesia to therapeutics, and for exhibiting to us the almost inexhaustible powers by which nature sometimes recovers patients from operations to us appalling by their boldness and magnitude, still we may safely say there is no American school of medicine; whereas there is a French, a German, an Italian, and an English. Our Transatlantic offspring reprint, translate, and pirate the medical works of other nations, but they produce little of their own."¹ To this Samuel D. Gross replied, "Mortifying as such an accusation is, it is certainly not wholly destitute of truth."² He and others of his day partially blamed publishing practices for the current state of affairs. The fact that the newly organized American Medical Association had a standing Committee on Medical Literature testified to the concern which was felt. This essay will describe the medical publishing business chiefly in America before 1879 and will include its financing and sales methods.

In the eighteenth century there was little or no distinction between the publisher, as we know him today, and the bookseller who was also a stationer, a word derived from the medieval Latin word *stationarius*, so-called because he occupied a fixed station in the town marketplace while selling his books and writing materials. The publisher was sometimes also the printer, but the latter tended to be separate. At the time of the American Revolution printing presses had been established in all the colonies. In the early years of the Republic, the number of presses expanded rapidly, moving west with the population following the frontier. Mostly the printers handled local needs for newspapers, almanacs, pamphlets, commercial notices, laws, and forms, however. As the nineteenth century advanced, despite the number of small-town publishers, the book publishers tended increasingly to be concentrated in Boston, New York, Philadelphia, and a few other large cities.³

In part this was due to changes in the process of manufacturing books. Between 1790 and 1860, printing was transformed from a handicraft, little changed in its essentials since the sixteenth century, to an industry. The ancient hand-powered flat press was replaced by the steam-powered cylinder press. Stereotyping and later electrotyping made it possible to manufacture and print from plates, which could be saved for later press runs or subsequent editions, rather than from the handset

type itself, and made rotary printing presses practicable. Type-casting machines made quantity production of foundry type possible early in the century and by the 1850s, practicable typesetting machines began to appear. Similarly, new papermaking machines permitted production of paper in rolls or sheets of any size at a much faster rate. With mechanization even the appearance of books began to change. While calf, sheep, and uncovered board bindings continued to be used, a cheaper cloth binding appeared in the 1820s in England and soon thereafter in America. Since the public evidently did not like the appearance of cloth-bound books, in 1832 the embossing press was invented in England to stamp designs and lettering onto the bookbinding cloth, sometimes simulating the grain of leather and with gold or blind stamping creating scenes or attractive designs. In the 1840s steam power replaced horsepower for the stamping presses.⁴

Facts about the financing of publication are obscure. In the early eighteenth century there were no royalties for authors, but some writers evidently received a considerable number of free books when the bookseller paid the costs of publication. Sometimes the author was paid outright for his book; sometimes he shared the profits. The royalty system was introduced before the Civil War, but one publisher, Henry Holt of New York, declared that "royalties exceeding 10 percent are immoral" and before 1880 even refused to give written contracts to authors. Most literary writers were at the mercy of the publishers until literary agents emerged in the 1880s. Before the Civil War, on an average, one-third of the retail price of a book was for the costs of manufacture, one-third was to cover the trade discount, and one-third was for profit, sometimes equally divided with the author, sometimes not. Some successful writers like Longfellow, Washington Irving, and James Fenimore Cooper financed their books themselves, paying a commission to the publisher to serve as printer and distributor. In the 1840s Longfellow established the custom of owning the stereotype plates of his books, which he leased to a publisher. This custom prevailed into the present century, when it was not uncommon for publishers to compel authors to pay the costs of the plates.⁵

In the medical field the sale would have been relatively limited, and either subscription or subvention by the author must have been common. Among the first British medical works to be reprinted for the use of American medical students was William Cullen's *Lectures on the Materia Medica* which was printed "for the subscribers" by Robert Bell in Philadelphia in 1775.⁶ In London John Hunter had his own press and published all but one of his books himself, employing at least three people to print, fold, and stitch the sheets at his house at 13 Castle Street.⁷ It is not known whether this was done to avoid piracy by Irish printers or

to preserve absolute control of the printed text—probably the latter since publishers were notorious for making unauthorized changes.

In 1875 when the maximum American medical readership numbered around 50,000,⁸ Gross reported that “The compensation of medical authors is seldom flattering; but of this we should, perhaps, not complain, inasmuch as this is by no means peculiar to our profession, but is shared by nearly all literary persons. Besides, medical authors are seldom obliged to live in garrets, as is so often the case with poets, novelists, and magazine writers, for they generally rely upon their practice for their daily bread, and employ their pen altogether in a secondary manner.”⁹ The first edition of an original work, which usually amounted to 1,000 copies, rarely paid the author anything; remuneration generally came with later editions. Physicians who undertook translations and editions of foreign books were poorly paid (from \$50 to \$200 according to Gross),¹⁰ while their publishers made a fortune. It was difficult to find a publisher for an original monograph. Gross had to travel all the way to Boston from Cincinnati in order to find a publisher for his book on pathological anatomy, while the publisher of Daniel Drake’s monumental work on the *Diseases of the Interior Valley of North America* required him to share the costs.

In 1855 C. G. Comegys of Cincinnati advertised his forthcoming translation of P. V. Renouard’s *Histoire de la médecine* by sending signatures of the book, then coming through the press, to the editor of the *Ohio Medical and Surgical Journal*, asking that subscriptions be solicited to help him cover the costs, and in the same volume Louis Agassiz published a prospectus of his projected ten-volume work on *Contributions to the Natural History of the United States*, to be published by Little, Brown and Company of Boston.¹¹ According to Gross, the American medical authors whose works had been most profitable to both author and publisher were Robley Dunglison, whose total sales approached 125,000 copies (his medical dictionary alone sold 55,000 copies), and George Bacon Wood and Franklin Bache’s *Dispensatory of the United States*.¹²

Compensation for journal articles was almost nonexistent. The report of the American Medical Association’s Committee on Medical Literature in 1863 mentioned that only one medical periodical paid for original articles, and this was probably the *American Journal of the Medical Sciences*, which was universally recognized as the leading American medical journal.¹³ In 1875 Gross noted that contributors to medical journals were paid “a dollar a page, doled out in greenbacks” as the ordinary compensation, but this could not have been true of the majority of the authors of the 4,781 articles that John Shaw Billings counted as published in the United States in 1879.¹⁴

How were books and journals distributed? This was very complicated, even chaotic, as the various forces of free enterprise operated.¹⁵ During the first part of the nineteenth century when publishing was mainly local and the publishers were also retail booksellers, there was a loose collaboration among booksellers in different parts of the country. A larger publisher-bookseller might have agreements with correspondent booksellers in other cities to be either copublishers or jobbers for his books. As copublishers the names of all firms involved would appear on the title page; as jobbers they would have exclusive rights to the sale of the books in their area. Sometimes the chief publisher sent unbound sheets of his publications to his local correspondent who had them bound locally, which explains the puzzling variety of bindings in so-called first editions. Similarly the sheets might appear with a different title page bearing the imprint of the local bookseller. This happened especially after the introduction of stereotype plates, which would be sold to booksellers in other cities. This system did not last long because of problems of payment and discounts. Gradually most publishers gave up retailing through their own bookstores. Improved transportation brought by the new railroads opened up wider markets, to which books printed in one city could be shipped with ease and speed through the postal or express agencies.

As the century advanced booksellers made spring and fall visits to the publishing centers of the East coast, and by midcentury also to Cincinnati. They also attended eight-day trade sales where publishers sold their remainders and surplus stock by auction. Finally, there was general wholesaling through jobbers who distributed books to the retail trade. They sold at cutrate prices which undermined the ordinary retail market. By the 1870s there was enormous turmoil in the bookselling market because of the variation of prices. A final culprit was the drygoods merchant, who added a book counter and sold at cutrate prices. John Wanamaker infuriated the booksellers by his statement that "Bookselling is a decaying business, here and in Great Britain. . . . Any merchant can sell popular books." In Portsmouth, New Hampshire, an angry bookseller retaliated by putting a complete assortment of drygoods in his store, while a western colleague commented in *Publishers' Weekly* in 1882, "The booksellers here are all anxiously waiting for the hog season to commence, to see if some of the large dry-goods houses intend to sell spare ribs and liver."

In addition to these various retail outlets another bookseller must not be overlooked: the book salesman who traveled from door to door throughout the country. The most famous was Mason Locke Weems, "Parson" Weems, who from 1794 to 1825 drove his horse and wagon up and down the eastern seaboard between New Jersey and Georgia

peddling the publications of Mathew Carey, an Irish immigrant who had become one of the major publishers of Philadelphia. Weems, a native of Maryland, had trained as a physician in London and Edinburgh before the Revolution, was ordained in the Church of England, but after a while gave up the ministry to become a traveling salesman, calling on planters and farmers as well as local booksellers. During his journeys he preached in local churches, fiddled for weddings, carried on a voluminous correspondence with Carey which is a rich source of information about life in his time, and wrote bestselling biographies, including the life of Washington that initiated the cherry tree myth.

The custom of book peddlers was not uniquely American. It had started in Britain and spread over Europe, but it was used there mainly by booksellers and not publishers. It was a favorite part-time work of disabled soldiers, aged clergyman, teachers, and students on vacation; book salesmen include such distinguished names as Napoleon Bonaparte, Otto von Bismarck, George Washington, Daniel Webster, Mark Twain, Henry Wadsworth Longfellow, Ulysses S. Grant, and Rutherford B. Hayes. By the end of the nineteenth century some American firms specialized only in subscription books peddled from door to door, ornate parlor-table books which frequently sold for more than books sold in bookstores. It has been estimated that sales of subscription books promoted in this way probably accounted for over two-thirds of the book sales during the last thirty years of the nineteenth century. While medical books for students and practitioners were probably sold in bookstores or through catalogue ordering, probably the vast majority of lay medical and home remedy books, of which numerous titles and editions exist, were sold from door to door.

It must be noted that the great diversity of retail sales methods was a distinctly American phenomenon. In Europe, during the second half of the nineteenth century, most books were still sold in bookstores and extensive training was required to work there. In Germany, for example, an aspiring bookseller first apprenticed himself for from two to four years to learn the trade. He learned ordering, shipping, and accounting methods, the organization of the publishing trade, how to handle customers, and above all a critical appreciation of literature and of bibliographical methods. Formal theoretical training was also available at a school such as the Leipzig school of bookselling, essentially a book trade academy. There were stepped ranks through which one rose: after apprenticeship, first the junior and then the senior clerk; finally, possibly a partnership or, with funds, one's own business. Prospective publishers frequently went through such an apprenticeship. In Germany it was considered undignified to sell anything but books, magazines, and music. Stationery was left to other shops. In England if stationery was sold at all

in the bookstore, it was usually sold in a separate room. How different in America where in 1855 a Columbus, Ohio, bookstore advertised itself as "General Dealers in Medical, Miscellaneous, Theological, Sunday School, Classical, and School Books, Blank Books, and Stationery, Writing Paper, Wall and Window Paper, Window Shades and Pictures, Fancy Goods, &c., &c."¹⁶ At that time there were three bookstores in Columbus where medical books could be purchased with a "liberal discount of 20 per cent from publisher's prices allowed to the profession."

Because of a lack of international copyright, pirated English books were among the principal moneymakers of American publishers, who thus not only saved money on authors but also avoided the import duties. In the first part of the nineteenth century pirated English books were a specialty of many Philadelphia publishers, as they had been earlier to Isaiah Thomas in New England. The dubious honor later passed to New York. It has been estimated that in 1820 Americans wrote 30 percent of the books published and the British 70 percent. Deploring piracy, Alfred Stillé, chairman of the AMA Committee on Medical Literature in 1850, wrote: "No sooner does an English work of merit or interest pass our custom house than it is seized by some member of the publishing trade, perhaps by several at once, and is shortly found in every book-shop in the Union, and sold at a price sufficient to pay only for the mechanical labour of its printing and distribution. Nothing of what goes to make up its intrinsic value as a literary or scientific work is included in its commercial price, and its author, by whose labour thousands of readers are instructed or amused, derives no benefit whatever from this unsanctioned appropriation of his toil."¹⁷ It must be stated though, that some more reputable publishers were fair, and purchased unbound sheets from the English publisher to issue under their own imprints.

The circumstances surrounding the first American edition of Charles Darwin's *Origin of Species* illustrate the ruthless competitive practices. Asa Gray in Boston had offered to see that an American authorized edition was issued promptly by a Boston publisher, if Darwin would send the sheets of the first edition as they were printed off in 1859. Darwin, who did not dream that his book would sell out on publication day, had forgotten about Gray's offer, and it did not occur to his London publisher to send over the sheets. Gray then arranged for sheets of the corrected second reprinting of the *Origin* to be sent to him, but discovered that two New York publishers, Appleton and Harper, had also announced a reprint. Gray reported to Darwin: "I wrote then to both New York publishers, asking them to give way to the *author* and his reprint of a revised edition. I got an answer from the Harpers that they withdraw—from the Appletons that they had got the book *out* (and the

next day I saw a copy); but that, 'if the work should have any considerable sale, we certainly shall be disposed to pay the author reasonably and liberally.' " The Boston publisher then withdrew also, and in the end Darwin did receive adequate compensation from Appleton.¹⁸

While American authors were protected in their own country by the first Article of the Constitution, which secures "for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries," a right for which Noah Webster had campaigned up and down the east coast, the struggle for international copyright went on throughout the nineteenth century, in spite of efforts of Henry Clay in the Senate before the Civil War and the organization of groups like the American Copyright Club, whose members included William Cullen Bryant and Edgar Allen Poe. The publishers did not wish to give up the profits of pirated books, and the public wished to retain the availability of cheap books. In Europe first Denmark in 1828, Prussia in 1836, England in 1837 made laws for international copyright containing reciprocity clauses, but only in 1891 was an international copyright law passed by the Congress of the United States which finally abolished piracy. The various Committees on Medical Literature of the AMA had been ambivalent on the subject. Most agreed that it was morally wrong, but on the other hand it had permitted the cheap availability of good medical books to American medical practitioners. However, it had also made publishers less likely to take the risk of publishing new American medical authors and thus had discouraged them from writing. At Louisville in 1854 the medical faculty had resolved not to recommend European publications as textbooks, but this was not strictly adhered to, and such a resolution was received negatively by the editor of the *Ohio Medical and Surgical Journal*, who argued that medicine was international in character and that foreign authors should not be excluded.¹⁹

After the Civil War the demand for American authors increased and publishers were more receptive. By 1870 J. J. Woodward, the AMA Committee chairman, noted the growing improvement in native American publications which made the dependence upon foreign literature less necessary, an improvement that he attributed to "the natural growth of population, bringing with it that increase of wealth and culture without which a rich and original medical literature is not to be expected," and he asked whether the AMA should not declare itself in favor of an international copyright and "use our best efforts as an Association and as individuals to secure its early passage."²⁰ In 1849 the AMA had instructed George B. Wood and Isaac Hays to prepare a memorial to Congress urging the passage of an international copyright law but this time no official action was taken.²¹

In 1879, although the *quantity* of American medical books and journal articles was exceeded only by those of France,²² with some exceptions the average quality fell far behind the European press. Throughout the nineteenth century the leaders of the profession were well aware of this. In 1848 Oliver Wendell Holmes commented that nearly all American original works were general treatises intended for students, which revealed "the national practical tendency" and that "the great *forte* of American medical scholarship has hitherto consisted in 'editing' the works of British authors. . . . A tacit alliance between writers and publishers has infused the spirit of trade into the very heart of our native literature. The gilt letters of the book-binder play no inconsiderable part in the creation of our literary celebrities."²³

So-called "Medical Libraries" were common, in which foreign books were reprinted in a compact form to serve as a reference collection for practitioners. For example, from 1831 to 1868 the Massachusetts Medical Society issued twenty-five volumes of "The Library of Practical Medicine" which included useful texts such as P. C. A. Louis on typhoid fever and James Copland's dictionary. In Philadelphia Robley Dunglison assembled an "American Medical Library" of English and French texts which were printed in seventeen volumes from 1837 to 1843. This may have been his own publishing venture, as the title pages give only the printer's name. At the same time he started to issue *The American Medical Intelligencer, a Concentrated Record of Medical Science and Literature* under the imprint of John J. Haswell of Philadelphia. This reprinted and abstracted journal articles from foreign sources. Publication was taken over in 1843 by Lea and Blanchard of Philadelphia, the descendant firm of Mathew Carey, with the new title *The Medical News and Library*. This was intended as a companion to its other periodical, the *American Journal of the Medical Sciences*, and was devoted to "lighter medical literature" in contrast to "the mature reflections" of the latter. The "Library" in its title referred to a section with separate paging which was a detachable part of each issue. When bound together these would provide students and practitioners with reprints of books on the principal branches of medicine by prominent British teachers. The price for the monthly *Medical News and Library*, embracing around three hundred pages a year, was one dollar, "the cheapest periodical of its kind in the Union," while for five dollars one could obtain both the *American Journal of the Medical Sciences* and the *Medical News and Library*. They could be ordered from all postmasters, who at that time were obligated to send all remittances and orders for journals free of postage by franking the letter.²⁴ As a means of increasing circulation the publisher urged local physicians to club together and get six copies of the *Medical News* for five dollars, or two copies of the *American Journal of the Medical*

Sciences and three of the *Medical News* for ten dollars per year, paid in advance. Physicians who obtained additional subscriptions were rewarded by receiving valuable medical books as gifts, while the postmasters who added to the circulation were given novels by Cooper, Fielding, or Smollett "now selling at fifty cents—and published in a periodical form which can be sent by mail."²⁵

Medical journals were relatively cheap. In 1849 the "oldest and best" journal, the *American Journal of the Medical Sciences* with its *Medical News and Library* cost five dollars and published 1,400 pages a year. The *Ohio Medical and Surgical Journal* cost two dollars for 600 pages, while the *Boston Medical and Surgical Journal* cost three dollars for more than 1,000. Among the republished foreign journals, the *London Lancet*, which from 1845 on was reprinted in small type in two columns, cost five dollars for more than 1,000 pages, while the *British and Foreign Medico-Chirurgical Review* was republished in America for three dollars. The English review journals, Braithewaite's *Retrospect* and Ranking's *Half-Yearly Abstract*, were also reprinted cheaply at seventy-five cents each per issue.²⁶

Most American journals had a chiefly local circulation and seldom lasted very long. In 1870 Nathan Smith Davis, as first president of the American Association of Medical Editors, outlined the history of American medical journalism and explained that journals frequently got started because the faculty of a local medical school wanted an organ, or because several ambitious young physicians desired "notoriety and access to the current medical literature. . . . in either case, a bookseller, or publisher, or some other business firm who can be made to think that the proposed journal would be a profitable medium for advertising his own wares, and that enough additional advertisements can be obtained to pay a large part of the expense of publication, is sought out, a bargain made, a prospectus issued, soon followed by the first number of the work."²⁷

In 1879 the United States led the world in the number of health-related journals being published, a total of 135, followed by Germany's 132, France's 109, and Italy's 69.²⁸ Nine years earlier Davis, assisted by J. M. Toner in Washington, compiled a list of about 120 regular medical journals which had been issued during the preceding fifty years. Of these one-half were discontinued within six months to three years of their founding, and of those currently published only 13 had been published for more than ten years.²⁹ It was obvious that the readership was split up into small regional factions, and some voiced regret that they did not unite to support a few good national journals.³⁰

In his centennial review of American medical literature, John Shaw Billings noted with relief that the German custom of publishing medical

books in parts ("Lieferung und Hefte") had not taken root in America, and that recently there had been an improvement in the quality of paper and typography.³¹ During the Civil War the scarcity and high price of paper had caused 24 medical journals of both North and South to cease publication. The deterioration in quality of the paper in this period is obvious today on our library shelves. The shortage also increased the use of minuscule type, a common aspect of Victorian books which has caused twentieth century readers to wonder whether all nineteenth century readers had myopia.³²

By the last quarter of the nineteenth century, when Billings was reviewing the literature, some publishers had begun to devote themselves exclusively to medical and scientific material. The oldest was William Wood and Company of New York, which had started in 1804 as a bookstore, became a favorite meeting place of physicians, imported English medical works, and gradually became a publishing firm specializing in medical reference works and encyclopedias. In 1932 it merged with the Williams and Wilkins Company of Baltimore and thus is still extant. In Philadelphia Mathew Carey's firm went through a succession of names in the nineteenth century and survives today as Lea and Febiger. In the middle of the nineteenth century it was driven by the strong competition of cheap paperbacks in the literary field to concentrate on medicine and science. By 1875, then known as H. C. Lea Company, it was the largest publisher of medical, surgical, and scientific books in the world. Also in Philadelphia the J. B. Lippincott Company prospered from its monopoly on the *Dispensatory of the United States* and became a leading medical publisher. Similarly, in midcentury Lindsay and Blakiston also began to specialize in medical, dental, and scientific books. In 1876 Billings estimated that more than half of all American medical books had been published in Philadelphia and one-fifth in New York, with the Lea firm leading with nearly 600 editions.³³

By this time medical literature, particularly journal articles, was accumulating so rapidly that the need for indexes was urgent. In his dedicatory address at the opening of the Boston Medical Library in December, 1878, Oliver Wendell Holmes humorously described the situation: "A great portion of the best writing . . . comes to us now, at stated intervals, in paper covers. The writer appears, as it were, in his shirt-sleeves. As soon as he has delivered his message the book-binder puts a coat on his back, and he joins the forlorn brotherhood of 'back volumes,' than which, so long as they are unindexed, nothing can be more exasperating. . . . [They] heap themselves into chaotic piles and bundles which are worse than useless, taking up a great deal of room, and frightening everything away but mice and mousing antiquarians. . . ." ³⁴

The following year *Index Medicus* appeared, to frighten away the mice, but not the antiquarians.

Notes

1. *Half-Yearly Abstract of the Medical Sciences*, Amer. ed., 22 (July-Dec. 1855): 208.
2. Samuel D. Gross, "Report on the Causes Which Impede the Progress of American Medical Literature," *Transactions of the American Medical Association*, 9 (1856): 360.
3. Hellmut Lehmann-Haupt, Lawrence C. Wroth, and Rollo G. Silver, *The Book in America: A History of the Making and Selling of Books in the United States*, 2d ed. (New York: R. R. Bowker, 1951), 46-51, 65-70, 119-129.
4. *Ibid.*, pp. 71-90, 148-50.
5. John Tebbel, *A History of Book Publishing in the United States* (New York: R. R. Bowker, 1972-), 1:210, 2:15.
6. Robert B. Austin, *Early American Medical Imprints* (Washington: Government Printing Office, 1961), no. 577.
7. John L. Thornton, *Medical Books, Libraries and Collectors: A Study of Bibliography and the Book Trade in Relation to the Medical Sciences*, 2d rev. ed. (London: Andre Deutsch, 1966), p. 315.
8. J. M. Toner, "Tabulated Statistics of the Medical Profession of the United States," *Trans. AMA*, 22 (1871): 155-56.
9. S. D. Gross, *History of American Medical Literature, from 1776 to the Present Time; Being an Address Introductory to the Fifty-first Course of Lectures in the Jefferson Medical College of Philadelphia, Delivered October 4th, 1875* (Philadelphia, 1875), pp. 66-67.
10. Gross, "Report on the Causes," p. 352.
11. *Ohio Medical and Surgical Journal*, 8 (1855): 76-78, 150.
12. Gross, *History of American Medical Literature*, p. 62.
13. *Trans. AMA*, 14 (1863): 99.
14. Gross, *History of American Medical Literature*, p. 67; J. S. Billings, "An Address on Our Medical Literature," *British Medical Journal*, 1881, 2:263.
15. The following discussion on the book trade is based primarily on Tebbel, *History of Book Publishing*, and Lehmann-Haupt, *Book in America*.
16. *Ohio Med. Surg. J.*, 8 (1856): facing p. 440.
17. *Trans. AMA*, 3 (1850): 181.
18. Francis Darwin, ed., *The Life and Letters of Charles Darwin* (New York, 1887), 2:63-65.
19. Gross, "Report on the Causes," p. 347; *Ohio Med. Surg. J.*, 8 (1856): 501-3.
20. *Trans. AMA*, 21 (1870): 108.
21. *Ibid.*, 2 (1849): 42; 3 (1850): 44, 213-15.
22. France, 5,826 books, theses, and journal articles; U.S., 5,091; Germany, 4,433; England, 3,774. Billings, "Address on Our Medical Literature," p. 263.
23. *Trans. AMA*, 1 (1848): 286.
24. "Prospectus," *Medical News and Library*, 1 (1843): 2.
25. *Ibid.*, advertisement at end of Feb. 1843 issue.
26. *Trans. AMA*, 2 (1849): 373-74.
27. N. S. Davis, "Address on the History, Condition, and Means of Improvement of Medical Journalism in the United States," *Chicago Medical Examiner*, 11 (1870): 421. Daniel Drake had nine different publishers for the first nine volumes of his *Western Journal of the Medical and Physical Sciences*. See George H. Daniels, *American Science in the Age*

of Jackson (New York: Columbia University Press, 1968), p. 15. John C. Burnham kindly supplied this information.

28. Billings, "Address on Our Medical Literature," p. 263.

29. Davis, "Address on Medical Journalism," p. 414.

30. *Medical Gazette*, 4 (1870): 234-35.

31. J. S. Billings, "A Century of American Medicine, 1776-1876. IV. Literature and Institutions," *American Journal of the Medical Sciences*, n.s. 72 (1876): 458.

32. *Trans. AMA*, 14 (1863): 100-101.

33. Lehmann-Haupt, *Book in America*, pp. 232-33; Tebbel, *History of Book Publishing*, 1:372; Billings, "Literature and Institutions," p. 459. Billings also estimated that Lindsay & Blakiston and Lippincott had published between 100 and 200 editions each, and William Wood 150.

34. O. W. Holmes, *Medical Essays 1842-1882* (Boston, 1883), p. 404.

Billings and Before: Nineteenth Century Medical Bibliography

John B. Blake

This year we are celebrating the one hundredth anniversary of *Index Medicus*, one of the many accomplishments of that towering figure of nineteenth century American medicine, John Shaw Billings. He is not an unsung hero. His official biographer, Fielding H. Garrison; our former Director, Dr. Frank B. Rogers; and other admirers past and present have described his contributions to medical education, hospital design, medical statistics, and public hygiene, but it is the National Library of Medicine, the *Index-Catalogue*, and *Index Medicus* that always receive first recognition. These were the achievements that William H. Welch called "probably the most original and distinctive contribution of America to the medicine of the world."¹

The outlines of Billings's career are well known. He was born in 1838, received his B.A. degree from Miami University in 1857 and his M.D. from the Medical College of Ohio in 1860. In 1861 he joined the Union Army as a surgeon. After serving in the field with the Army of the Potomac, he was assigned to the Surgeon General's Office in Washington in December 1864. Unlike most soldiers, he stayed in the Army after the war was over. At first most of his work seems to have been pretty dull office routine, and one wonders what it was that motivated an experienced and talented surgeon to continue in this career, once patriotism no longer demanded it. Be that as it may, in the fall of 1865 he was placed in nominal charge of the small library in the Surgeon General's Office. Before long he began in his persistent, methodical, and dedicated way to build it up. Backed by Surgeon General Joseph K. Barnes, Billings was determined to create a "National Medical Library," and in fourteen years he turned a collection of less than 2,500 volumes into one of over 100,000.

As the Library grew, so did successive catalogues listing the holdings. In January 1874 Billings also began indexing the journals. By the summer of 1875 he had accumulated tens of thousands of cards. Those from "Aabec" to "Air" were arranged and sent off to the Government Printing Office for publication of a *Specimen Fasciculus of a Catalogue of the National Medical Library*. It set forth designs for a dictionary catalogue combining authors and subjects in one alphabet. Separate monographs were listed under both author and subject;

periodical articles were indexed under subject alone, but with a full citation. The object of the *Specimen Fasciculus*, Billings wrote, was "to show the character and scope of the collection, to obtain criticisms and suggestions as to the form of catalogue which will be most acceptable and useful, and to furnish data for the decision as to whether it is desirable that such a work should be printed and distributed."² The implications of the last phrase become apparent from the letter that accompanied sample copies sent to strategically placed physicians around the country. As Billings hoped and expected, they used their lobbying skills to help persuade Congress to appropriate the necessary funds to publish a full catalogue. In 1880 the *Index-Catalogue of the Library of the Surgeon General's Office, United States Army*, volume one, "A—Berliński," came off the press. When the first series was finally complete in 1895, it took sixteen volumes. It listed some 170,000 books and pamphlets under both author and subject and over 500,000 journal articles under subject alone.³ By any measure it was a stupendous achievement, carried through by Billings, his chief coadjutor Dr. Robert Fletcher, a few volunteer physician indexers and proofreaders, a handful of clerks, and hundreds of thousands of index cards.

Since the *Index-Catalogue*, for all its virtues, could not keep up with new information as it was published, *Index Medicus* was devised as a monthly periodical supplement, listing current books and journal articles in a classified subject arrangement. It was prepared under the editorial supervision of Billings and Fletcher as a by-product of the *Index-Catalogue*. With the permission of the Surgeon General, cards for current material prepared on official time for the *Index-Catalogue* were regularly copied by Library clerks in their off-duty hours and forwarded to the publisher, F. Leypoldt, in New York. The first issue was dated January 31, 1879. At the end of the year, an author index and an alphabetical subject index completed the volume.⁴ The subsequent history of *Index Medicus* is discussed by Dr. Frank B. Rogers elsewhere in this volume.

This bare recital of the creation of the Library, the *Index-Catalogue*, and *Index Medicus* inevitably raises the question, what impelled Billings to do it?

In answer, Garrison and others have regularly quoted Billings's remarks in a commencement-day address to the Society of the Alumni of the Ohio Medical College in 1888. In this speech Billings described how, in order to prepare his thesis for the M.D. degree, he had "ransacked" the libraries of Cincinnati and had had search made in New York, Philadelphia, and elsewhere to find certain data "in their original and authentic form." From this experience he concluded that it required a vast effort to search the individual indexes of thousands of books and

journals (implying that there was no other way to find desired references); that somewhere there existed "over 100,000 volumes of . . . medical books and journals, not counting pamphlets and reprints"; and that in the United States there was not even one "fairly good" medical library. It was this experience which led him, Billings wrote, when the opportunity arose after the war, to establish the Library and the *Index-Catalogue*.⁵

Historians are trained to receive with a certain skepticism the reminiscences of eminent men about their school days, and I believe this statement is worthy of some further examination. Billings's thesis was published in June 1861.⁶ It reported on various surgical operations that had been used for the treatment of epilepsy, the most common of which was trephination in cases when the disease had followed upon an injury to the head. After describing two cases that he had witnessed in the practice of his preceptor, Billings continued: "Dr. Stephen Smith, in a paper published on this subject in the *N. Y. Journal of Medicine* for March, 1852, has given a table of twenty-two cases, in which the operation was performed, all being more or less successful. I have examined the reports of a number of cases in addition to those mentioned by Dr. Smith, and a brief account of the whole is given in the following table."

This table, which is the most impressive part of the paper,⁷ includes citations to forty-seven different reports from the literature. A careful analysis suggests, however, that Billings probably derived eighteen of his citations from Smith's article and thirteen from Victor Bruns's *Handbuch der praktischen Chirurgie*, published in 1854. Four were from the great French *Dictionnaire des sciences médicales*, and six from standard English and American texts in surgery and neurology. In less than a dozen does he seem actually to have examined the original source. Moreover, three of the reports all refer to the same case and at least five cases are not relevant. Thirteen of the citations are seriously in error. Without undue research but with obviously greater resources, I have found an additional twenty-seven cases reported in the literature before 1860. Many were printed in foreign journals or buried in collections of case reports, but relevant articles were also published in the *American Medical Monthly*, New York, 1855; the *Medical Examiner*, Philadelphia, 1856; the *Transylvania Medical Journal*, Louisville, 1851; and, most surprisingly, the *Cincinnati Lancet and Observer*, 1858, in the very city where Billings was studying medicine and in the journal where he published his own review three years later.⁸ As Billings himself observed in a comparable situation, "when one calls attention to his own bibliographical work . . . , it is a sort of challenge which some carper and doubter is sure to take up sooner or later."⁹

My purpose in bringing this out is not to criticize Billings. In his thesis he did not disguise the fact that he had consulted Smith, Bruns, the *Dictionnaire*, and other textbooks, nor did he claim to have made an exhaustive search. His thesis was neither as accurate nor as original as Stephen Smith's paper of 1852, but for an American medical student of that era, it was a highly creditable job. It demonstrates his nascent bibliographic and scholarly interests and a considerable critical sense. It also foreshadows his factual and statistical approach to the solution of problems, his penchant for tabular analysis and display, and his interest in discrete clinical observations and case reports. Billings was to make his mark in fields requiring administrative ability and the organization and presentation of data collected from others rather than in original laboratory or clinical research. With the advantage of hindsight, it is these characteristics, as much as his interest in books and bibliography, that we can perceive in his thesis today.

It is difficult to believe, however, that his student experience provided the primary impetus to Billings's later career rather than an apt story on which to hang a speech to his fellow alumni, who had also been subjected to the "melancholy duty" of writing an inaugural thesis. It is doubtful, for example, that he searched quite as hard as he afterwards intimated. Some of the facts and conclusions presented in the address were probably not reached in 1860 but a good deal later,¹⁰ and others were no doubt exaggerated for effect.

One of these later exaggerations was the remark that there did not exist even one "fairly good" library in the United States. While the condition of American medical libraries was on the whole deplorable in 1860, this seems a rather severe characterization of the library of the Pennsylvania Hospital. It totaled nearly 11,000 volumes and comprised, in the words of Dr. Emil Fischer, who prepared its excellent catalogue of 1857, "a fair representative of medical standard literature, particularly in its English and French part. . . ." Its holdings included some 60 percent of the original sources of the reports listed in Billings's table.¹¹

A more significant exaggeration was the implication that to find the references on a particular subject one's only recourse was to examine the indexes of individual books and journals. Contemporary textbooks and dictionaries often provided an extensive bibliographic apparatus. Moreover, as Billings well knew, there were a number of useful bibliographies that existed in 1860. Their history has been set forth most fully by Dr. Estelle Brodman in *The Development of Medical Bibliography* (1954). It begins in 1506 with Symphorien Champier's *De Medicine Claris Scriptoribus*, a naive listing of only historical interest today. In successive decades and centuries others enlarged and refined the field of bibliography. By the 1700s these scholars had reached an

essential consensus on the primary elements to be used in describing books and had prepared bibliographies exhibiting a variety of approaches both by author and subject. Their work must even today command our admiration.

Two works available to the medical researcher of 1820 or later deserve especial mention. The first is Wilhelm Gottfried Ploucquet's *Literatura Medica Digesta*, four volumes and supplement, 1808-14. It is an admirably organized subject bibliography in which are indexed even individual case reports buried in large tomes containing hundreds of observations. The second is J. D. Reuss's *Repertorium*, sixteen volumes, 1801-21, a subject index of the transactions of learned societies of the seventeenth and eighteenth centuries. Seven volumes are devoted to medicine. Together these two still provide the best general subject approach to the medical literature published before 1800.¹²

As Ploucquet himself saw, however, the already rapidly expanding growth of the literature was making it increasingly difficult for a single individual to compile comprehensive retrospective subject bibliographies. One partial substitute was library catalogues, some of which were useful bibliographical tools quite apart from their function as guides to particular collections. The *Catalogue Raisonné of the Medical Library of the Pennsylvania Hospital*, published in 1857, is a good example.

Such catalogues listed serials by title only, and although Reuss's work demonstrated the value of a periodical index, others were slow to follow. The compilers of the *Catalogue Raisonné* of the library of the Royal Medical Society of Edinburgh in 1837 proposed in a future edition "to extend the present plan of the Catalogue, by incorporating with it many valuable papers on subjects connected with Medicine and the collateral Sciences, which are to be found scattered through the various British and Foreign periodical works in the possession of the Society," but nothing came of the plan.¹³ In his annual report for 1851, Joseph Henry, Secretary of the Smithsonian Institution, called attention to the fact that "about twenty thousand volumes . . . purporting to be additions to the sum of human knowledge, are published annually; and unless this mass be properly arranged, and the means furnished by which its contents may be ascertained, literature and science will be overwhelmed by their own unwieldy bulk. . . . One of the most important means of facilitating the use of libraries," he continued, "particularly with reference to science, is well-digested indexes of subjects, not merely referring to volumes or books, but to memoirs, papers, and parts of scientific transactions and systematic works." Eventually Henry's suggestion bore fruit in the Royal Society of London's *Catalogue of Scientific Papers*, a retrospective author bibliography of articles in scientific jour-

nals and transactions. The first series, covering literature published from 1800 through 1863, came out in six volumes from 1867 to 1872. In time the *Catalogue* was continued in subsequent series to 1900, but the promised subject index did not begin to come out until 1908, and it was never completed.¹⁴

The idea of publishing an index to periodical literature thus was not new in 1870. William F. Poole had in fact issued the first edition of his index to general periodical literature in the English language in 1848 and a second, greatly enlarged edition in 1853. Dr. Joseph M. Toner of Washington had already started indexing American medical journals when Billings also started indexing in 1874, and for that reason Billings at first planned to index only the foreign ones.¹⁵ There was, however, no comprehensive subject index to the medical literature of the nineteenth century. It was this void that the *Index-Catalogue* would attempt to fill.

The planned *Index-Catalogue* foreseen in the *Specimen Fasciculus* could not solve all problems of medical bibliography. Medical science was changing at an ever quickening pace in the nineteenth century, and it seemed increasingly important to have the latest information rapidly at the same time that the expanding amount of information—or at least of publication—made it even more difficult to keep up. One potential solution to this bibliographic impasse was to cut back on the amount of literature covered by selecting critically the best material on a subject and eliminating the rest. Another method was to include only recent literature, allowing the searcher to rely on earlier bibliographies for past works. Both principles are exemplified in review and abstract journals, which began to appear in the eighteenth century. As the editors of *Medical and Philosophical Commentaries* wrote in 1773, review journals were intended to give “a summary view of all the best medical books, and of all the remarkable medical papers contained in the transactions of public societies, as soon after these publications shall appear, as the nature of the work here proposed will allow.”¹⁶

As the nineteenth century advanced, abstract journals were developed notably by the Germans, who became leaders not only in laboratory research but also in bibliography. Curiously, Billings does not seem to have rated them very highly. In his 1876 paper on medical libraries published in a thick centennial volume on *Public Libraries in the United States*, he listed several library catalogues, Haller, Ploucquet, Reuss, Callisen, Pauly, and the Royal Society's *Catalogue of Scientific Papers* (all of which were comprehensive bibliographies covering many years rather than guides to current literature) as especially useful for reference in medical bibliography, but he did not list a single German abstract journal. Although several contributors to the volume expressed great interest in periodical indexes, only Dr. Theodore Gill, of the

Smithsonian Institution, in his paper on "Scientific Libraries in the United States," gave credit to the abstract journals, which he justly described as "among the most important and really indispensable works of reference for the scientific investigator. . . ." ¹⁷ Even these, however, did not provide a comprehensive index to current publications. It was this gap that *Index Medicus* was intended to fill.

As the centennial volume just quoted makes clear, the world of libraries and bibliography was in ferment in the 1870s. The remarkable thing about the *Index-Catalogue*, I believe, is not that Billings had the idea of producing it, for the need was not hard to perceive, but that, having perceived it, he had the courage to undertake this monumental task along with all his other duties and the determination and ability to carry it through, with the aid of Fletcher, to a magnificently successful conclusion.

The origin of *Index Medicus* is not so clear. Garrison and other biographers have regularly credited Billings and Fletcher, apparently assuming that the conception was theirs. *Index Medicus*, however, was published by the firm of F. Leypoldt in New York. Frederick Leypoldt was born in Germany in 1835, emigrated to the United States some twenty years later, worked first for a bookseller, and later went into publishing. In 1868 he started the *Literary Bulletin*, a monthly record of current foreign and American books, and in 1869 *The American Catalogue of Books*, an annual, which soon evolved into, respectively, *The Publishers' Weekly* and *The Publishers' Trade List Annual*. In the latter Leypoldt provided a special index of medical books as early as 1875. In 1876 Leypoldt participated actively in the organization of the American Library Association and began publishing the *American Library Journal*. Thus he had already established the nation's leading periodical guides to current books and a number of other bibliographical publications when he and Billings found common meeting ground at the ALA. His biographer, associate, and friend, Adolf Growoll, has written:

In 1879 Leypoldt, desiring to carry his bibliographical enterprise into fresh fields, projected the *Index Medicus*, a monthly key to medical books and periodicals, which should be a periodical supplement to the great "Index Catalogue of the Library of the Surgeon-General's Office United States Army," by Dr. John S. Billings, now of the New York Public Library, Astor, Lenox, and Tilden Foundations. Fearing that his friends and associates would be inclined to persuade him from new ventures, he kept his plans quiet until they were nearly ready for the launch. Dr. Billings and Dr. Robert Fletcher undertook the editorship, and the work proved professionally very valuable. But its too sanguine projector lost over \$5000 by it, just as the skies were clearing for him, and for some years it was continued only as a labor of love, under certain guarantees from the profession. ¹⁸

In the "Prospectus" to *Index Medicus* which Billings wrote in November 1878, after briefly describing the proposed *Index-Catalogue*, he stated:

It has often been suggested that it is highly desirable that such a Catalogue should be supplemented by some current publication, which should show all recent works, together with articles in periodicals, *arranged by subjects*, but until quite lately no proper means have been available for such an undertaking. Now, however, Mr. F. Leypoldt, of New York, proposes to undertake the publication of such a current medical bibliographical serial, upon the condition that the manuscript for it be furnished of the requisite completeness and accuracy, and this last I have undertaken to supply, so far as the means of information at my command will permit.¹⁹

Whether the initiative came from Billings or Leypoldt cannot now be determined. The idea of a periodical medical index may well have germinated, as Billings implied, in a number of minds.²⁰ Billings and Fletcher, however, were responsible for the editorial design and content of *Index Medicus*. Certain it is that without their efforts and without the opportunity to tie in the preparation of copy for the publisher with the acquisition and indexing program already established at the Library, *Index Medicus* would not then have been possible. The opportunity to use *Index Medicus* to enhance the Library's acquisitions was a further inducement to Billings. But in our admiration for Billings's contributions, we should not overlook the fact that neither would it have been possible without the participation and support of Leypoldt, who continued publishing *Index Medicus* until his death in 1884.

We all know, or think we know, that the *Index-Catalogue* and *Index Medicus* are a monumental work. But how well, really, did they fill existing bibliographic gaps? To test this in a small way, let us return to the principal subject of Billings's thesis, the treatment of epilepsy by trephination. Altogether, using a variety of bibliographic sources in a search that was by no means exhaustive, I have found twelve relevant reports published before 1812, of which six are in Ploucquet and two in the *Index-Catalogue*. For the period from 1812 through 1850, I have citations to thirty-seven reports, of which nine have been found in one or another abstract journal, and seventeen in the *Index-Catalogue*. For 1851 through 1860, I have citations to sixteen reports, of which only two have been found in abstract journals, while fourteen are in the *Index-Catalogue*. Thus for the earlier years, when most of the reports are buried in monographs, Ploucquet outperforms the *Index-Catalogue*, as expected; for later years, the *Index-Catalogue* clearly outperforms the abstract journals, not only in ease of use for retrospective searching but also in extent of coverage.²¹

A comparison of *Index Medicus* for 1879 with the abstract journals reveals similar results. For example, the two major German abstract and review journals, *Schmidt's Jahrbücher der in- und ausländischen gesammten Medicin* and *Jahresbericht über die Leistungen und Fortschritte in der gesammten Medicin*, have about 10,000 citations each. The major French abstract journal, *Revue des sciences médicales en France et à l'étranger*, has about 7,000. Several additional German and French specialty abstract journals average around 1,000 citations each. No comparable English-language publication existed. Braithwaite's *Retrospect of Practical Medicine and Surgery* for 1879, an English abstract journal reprinted in New York, had only 261 abstracts, nearly all from British journals. The Philadelphia *Monthly Abstract of Medical Science* had about 500 a year and the *Half-Yearly Compendium of Medical Science*, also published in Philadelphia, 417. The first volume of *Index Medicus*, in contrast, lists some 24,000 citations to books and journal articles, nearly two and a half times as many as its nearest rival. From a half-dozen German abstract journals it was possible to cull two citations on trephination in the treatment of epilepsy published in 1879; from *Index Medicus*, five. One cannot get from *Index Medicus* anything comparable to the half-page abstract of the most important article which was provided by the *Centralblatt für Chirurgie*, but for extent of coverage combined with bibliographical accuracy and timeliness, *Index Medicus* established itself with the first issue as supreme.²²

Even in this year of its centenary, one cannot discuss the founding of *Index Medicus* without linking it to the *Index-Catalogue*. In Billings's day, the latter overshadowed its companion. As Sir William Osler wrote in 1913,

No undertaking in bibliography of the same magnitude dealing with a special subject had ever been issued, and its extraordinary value was at once appreciated all over the world. . . .

In 1879 a monthly supplement to the "Index Catalogue" was begun as the "Index Medicus," a publication of the greatest value to students, which is now continued by the Carnegie Institution of Washington. There is no better float through posterity than to be the author of a good bibliography. . . . A hundred consult Haller's bibliographies for one that looks at his other works, and years after the iniquity of oblivion has covered Dr. Billings' work in the army, as an organizer in connection with hospitals, and even his relation to the great Library, the great Index will remain an enduring monument to his fame.²³

Since 1913 the *Index-Catalogue* has perforce been discontinued, while *Index Medicus* has grown mightily and produced its own vigorous offspring. Despite Osler's prediction, the National Library of Medicine, as it now is, has outstripped the *Index-Catalogue* at least in current fame. But the creation of this Library as well as its bibliographic tradition was

also part of Billings's conception and achievement. Harking back again to his thesis as our touchstone, I can tell you that out of the forty-five original reports of the cases listed in Billings's table on the treatment of epilepsy by trephination going back to the seventeenth century, in German, French, Italian, English, Irish, and American sources, it is now possible to track down and verify in this Library all but one.

Notes

1. The principal biography is Fielding H. Garrison, *John Shaw Billings, a Memoir* (New York: G. P. Putnam's Sons, 1915). Other accounts of Billings's life and of the history of the National Library of Medicine are listed in Frank B. Rogers, ed., *Selected Papers of John Shaw Billings* (Baltimore: Medical Library Association, 1965), pp. 11-13, and Manfred J. Wasserman, "Historical Chronology and Selected Bibliography Relating to the National Library of Medicine," *Bulletin of the Medical Library Association*, 60 (1972): 551-58. The quotation from Welch is in *Memorial Meeting in Honor of the Late Dr. John Shaw Billings, April 25, 1913* (New York: New York Public Library, 1913; reprinted from its *Bulletin*), p. 10.

2. U.S. Army, Surgeon General's Office, *Specimen Fasciculus of a Catalogue of the National Medical Library* (Washington, 1876), p. iii.

3. Precise statistical details are given volume by volume in a table in *Index-Catalogue of the Library of the Surgeon-General's Office, United States Army*, [1st ser.], 16 vols. (Washington, 1880-95), 16:iii.

4. In addition to works referred to in note 1, I have had the benefit of using the draft manuscript of a history of the Library which Wyndham Miles is preparing for publication.

5. J. S. Billings, "The Medical College of Ohio before the War," *Cincinnati Lancet-Clinic*, n.s. 20 (1888): 297. For use of the passage, see, for example, Garrison, *John Shaw Billings*, pp. 14-16; Harry Miller Lydenberg, *John Shaw Billings* (Chicago: American Library Association, 1924), pp. 14-16; Estelle Brodman, *The Development of Medical Bibliography* (Baltimore: Medical Library Association, 1954), pp. 111-12; Rogers, *Selected Papers*, pp. 4-5.

6. J. S. Billings, "The Surgical Treatment of Epilepsy," *Cincinnati Lancet and Observer*, n.s. 4 (1861): 334-41.

7. The trephination table was reprinted in "Surgical Treatment of Epilepsy," *American Journal of the Medical Sciences*, n.s. 42 (1861): 299; and in *Half-Yearly Abstract of the Medical Sciences* (London), 34 (1861): 58-59. Billings's work was referred to in at least two review articles, James Russell, "Trephining for the Relief of Epileptiform Attacks, Occurring after Injury to the Head," *British Medical Journal*, 1865, 1:610; and M. G. Echeverría, "De la trépanation dans l'épilepsie par traumatismes du crâne," *Archives générales de médecine*, 7th ser. 2 (1878): 652-53. It has recently been examined from the viewpoint of the history of surgery in John D. French and Louise Darling, "The Surgical Treatment of Epilepsy in 1861," *Journal of the International College of Surgeons*, 34 (1960): 685-91.

8. See Appendix.

9. J. S. Billings, "Medical Bibliography" (1883), in Rogers, *Selected Papers*, p. 157.

10. With respect to Billings's conclusion on the size of the medical literature, it may be noted that in his address, "Our Medical Literature" (1881), he estimated that it now formed "a little over 120,000 volumes properly so called," excluding pamphlets. Rogers, *Selected Papers*, p. 116. Brodman, *Development of Medical Bibliography*, p. 111n, suggests that the

actual figure for the size of the literature in 1860 was probably considerably higher. As of June 30, 1888, the Library's collection totaled 86,259 bound volumes, excluding pamphlets and theses. Miles, *History*, chap. 10, citing annual reports of the Surgeon General. The argument that it would not be possible in American libraries to verify references given by European authors appears in another form in the unsigned "Memorandum," no doubt by Billings, that heads the 1872 *Catalogue of the Library*.

11. Emil Fischer, *Catalogue Raisonné of the Medical Library of the Pennsylvania Hospital* (Philadelphia, 1857), p. v. Forty-two of the original sources of reports listed in Billings's table were published before 1857; twenty-five of them are listed in the catalogue. For brief descriptions of this and other medical libraries in the United States, see William J. Rhees, *Manual of Public Libraries, Institutions, and Societies, in the United States, and British Provinces of North America* (Philadelphia, 1859). The library of the Medical College of Ohio, with about 2,000 volumes, was stagnant, and Daniel Drake's efforts to establish a medical library in Cincinnati in 1851 had collapsed soon after his death in 1852. See his *Discourses Delivered by Appointment, before the Cincinnati Medical Library Association, January 9th and 10th, 1852* (Cincinnati, 1852), pp. 62-65, 88-93; Otto Juettner, 1785-1909. *Daniel Drake and His Followers* (Cincinnati: Harvey Publishing Co., 1909), pp. 442-43; Charles A. Isetts, "The History of Medical Libraries in Cincinnati," *Cincinnati Historical Society Bulletin*, in press. However, Reuben D. Mussey of Cincinnati is reported to have had an excellent private medical library to which Billings would probably have had access. Private communication from Dr. Isetts, Head, History of the Health Sciences Library and Museum, University of Cincinnati, who is preparing a catalogue of the Mussey collection.

12. Billings acknowledged their value in "Medical Libraries in the United States" (1876), noting that "It would not probably be desirable to extend an index of these [medical journals] farther back than 1800, as the works of Ploucquet and Reuss fairly cover all medical periodical literature of any importance prior to that date." Rogers, *Selected Papers*, p. 83.

13. *Catalogue Raisonné; or, Classified Arrangement of the Books in the Library of the Medical Society of Edinburgh* (Edinburgh, 1837), p. iv. Billings referred to this plan in "Medical Libraries in the United States" (1876; Rogers, *Selected Papers*, pp. 83-84), citing Professor MacLagan in "Edinburgh Medical Journal, January, 1873 [*sic*; actually 1875], p. 585." MacLagan's article was printed after Billings began indexing journals, not before, as the incorrect date in the citation would suggest.

14. Brodman, *Development of Medical Bibliography*, pp. 93-104.

15. J. S. Billings, "Medical Libraries in the United States" (1876), in Rogers, *Selected Papers*, p. 82. Toner was unable to find a publisher for his index. For his many contributions to medical libraries, bibliography, and history, see Whitfield J. Bell, Jr., "Joseph M. Toner (1825-1896) as a Medical Historian," *Bulletin of the History of Medicine*, 47 (1973): 1-24.

16. *Medical and Philosophical Commentaries*, 1, pt. 1, 2d ed. (London, 1774): 9. For the development of abstract and review journals and indexes to 1790, see David A. Kronick, *A History of Scientific and Technical Periodicals: The Origins and Development of the Scientific and Technical Press, 1665-1790*, 2d ed. (Metuchen, N.J.: Scarecrow Press, 1976), pp. 171-201, 259-77; for subsequent development, see Bruce M. Manzer, *The Abstract Journal, 1790-1920: Origin, Development and Diffusion* (Metuchen, N.J.: Scarecrow Press, 1977).

17. J. S. Billings, "Medical Libraries in the United States," in U.S. Bureau of Education, *Public Libraries in the United States of America: Their History, Condition, and Management*, pt. 1 (Washington, 1876), pp. 181-82; Theodore Gill, "Scientific Libraries in the United States," in *ibid.*, pp. 188-214.

18. Adolf Growoll, *Book Trade Bibliography in the United States in the Nineteenth Century* (1898; reprint ed., New York: Burt Franklin, [1965?]), pp. lxxvii-lxxviii (quotation p. lxxvii); Jay W. Beswick, *The Work of Frederick Leyboldt, Bibliographer and Publisher* (New York: R. R. Bowker, 1942), pp. 5-64. I am indebted to Dr. Genevieve Miller for bringing Growoll's work to my attention.

19. *Index Medicus*, 1, no. 1 (Jan. 31, 1879): 2.

20. For example, William D. Chapin, compiler of an annual *Index to Original Communications in the Medical Journals of the United States and Canada* (New York) for 1877 and 1878. It lasted only two years, indexing 65 journals the first year and 69 the second.

21. For the period before 1812 (the cutoff for Ploucquet), Bruns has 10 and Billings 9 of the 12 reports; for 1812–50 (which is as late as the coverage of Bruns and Smith extends) they have 27 and Billings 28 of the 37 reports; for 1851–60, Billings has only 4 out of the 16 reports. This further emphasizes Billings's reliance on Bruns and Smith, but also shows that good investigators with reasonable library facilities, aided by earlier bibliographies (Bruns took many of his citations from earlier compilations, abstract journals, etc., which he scrupulously noted) could outperform even the *Index-Catalogue*. Bibliographies can greatly aid but not completely replace the investigator's own imaginative research in the literature.

22. The five citations listed in *Index Medicus* are: (1) J. F. West, "Trephining for Epilepsy," *British Medical Journal*, 1879, 1:291; (2) idem, "Epilepsy Cured by Trephining," *Birmingham Medical Review*, 8 (1879): 200; (3) idem, "Trephining for Traumatic Epilepsy," *British Medical Journal*, 1879, 2:865–66; (4) idem, "Trephining for Traumatic Epilepsy," *Lancet*, 1879, 2:798–800; (5) Charles O'Leary, "Trephining in Epilepsy," *Transactions of the Rhode Island Medical Society*, 2, pt. 2 (1878/79): 95–106. The first two are brief reports of a case presented to the meeting of the Birmingham and Midland Counties Branch of the British Medical Association on January 9, 1879, and are essentially identical. The second two, also essentially the same, report a more extensive account and discussion of the same case presented to the Royal Medical and Chirurgical Society on November 25, 1879. The reader who has seen (3) or (4) will learn nothing new from the other reports by West. O'Leary's paper presents a case in his practice and a discursive discussion of the subject generally, much of it cribbed from Billings's article.

Citation (3) is also found in *Jahresbericht über die Leistungen und Fortschritte in der gesammten Medicin*, Jahrg. 14 (1879), 2:387; in *Centralblatt für Chirurgie*, 7 (1880): 190–91, with a half-page abstract; and in *Revue des sciences médicales*, 15 (1880): 396; Citation (4) is in *Jahrbuch für practische Aerzte*, 3 (1880): 425–26. In comparison with users of the abstract journals, therefore, users of *Index Medicus* would have benefited from having citations to two case reports instead of one, and they would also have had more complete citations.

23. *Memorial Meeting in Honor of . . . Billings*, pp. 9–10.

Appendix

Listed below under numbers 1–47 are the reports given by Billings in his table on the use of trephination in the treatment of epilepsy. They have been rearranged into alphabetical order by "Operator," and reports based on personal communications have been eliminated. For each report are given in order:

- (a) "Operator," number of cases if more than one, and "Where Reported," as given by Billings. Serious errors affecting retrieval are signaled by [!].
- (b) Billings's citation expanded and if necessary corrected.
- (c) The original source of the report, insofar as it could be determined.
- (d) Bibliographies and other references citing the original source. Bibliographies are included only if they index the source under the most specific approach, i.e., for *Index-Catalogue*, "Epilepsy (Treatment of)," and for Ploucquet, "Epilepsia. Therapia. Trepanum."
- (e) Probable source used by Billings.
- (f) Comment.

The citations probably derived from Smith are numbers 9–10, 13–15, 19–24, 31, 33–34, 39, 41, 44, and 46; from Bruns, numbers 4, 11, 16–17, 28, 32, 35–38, 40, 43, and 45.

Numbers 5-6 and 29-30 are from the *Dictionnaire des sciences médicales*, numbers 1, 3, 8, 16, 18, and 26 from English or American texts in surgery or neurology. It is impossible to determine how many of the citations presumably derived from Smith were also examined in the original, as in the case, probably, of numbers 15, 23, and 24. Two of the textbooks cited (1 and 18) were also original sources.

Seriously erroneous citations include numbers 6, 9, 13, 16, 21, 22, 24, 25, 27, 30, 36, 41, and 46. Numbers 3, 8, and 43 all refer to the same case. For irrelevant cases, see numbers 1, 6, 13, 36, and 38; doubtfully relevant are numbers 4, 5, and 31.

Numbers 48-71 below list additional reports published before 1860 which were not included in Billings's table. For each report are given (a) the original citation, and (b) bibliographic sources listing it. The search for cases was not exhaustive, nor are the listings under category (b). The name of the operator in parentheses precedes the citation if it differs from that of the author, as does the number of cases if more than one.

A list of frequently cited references follows.

Allgemeines Repertorium der gesammten deutschen medizinisch-chirurgischen Journalistik.

Bruns, Victor, *Handbuch der praktischen Chirurgie für Ärzte und Wundärzte. Erste Abtheilung: Gehirn und Umhüllungen* (Tübingen, 1854), pp. 1044-48.

Index-Catalogue of the Library of the Surgeon-General's Office, United States Army, [1st ser.], 16 vols. (Washington, 1880-95), 4:293-301.

Ploucquet, Wilhelm G., *Literatura Medica Digesta; sive, Repertorium Medicinæ Practicæ, Chirurgiæ, atque Rei Obstetriciæ*, 4 vols. (Tübingen, 1808-09), 2:39; *ibid.*, *Continuatio et Supplementum I* (Tübingen, 1814), p. 58.

Schmidt's *Jahrbücher der in- und ausländischen gesammten Medicin*. 1834-43 as *Jahrbücher* . . . ; 1844-54 as *Carl Christian Schmidt's Jahrbücher*. . . .

Smith, Stephen, "The Surgical Treatment of Epilepsy, with Statistical Tables, Comprising All the Recorded Cases of Ligation of the Carotid Artery: and Also of Trephining the Cranium by American Surgeons," *New-York Journal of Medicine, and the Collateral Sciences*, n.s. 8 (1852): 220-42 (table, pp. 236-41).

1. (a) Bell (4 cases): Bell's *Surgery*, vol. ii.
 (b) Bell, Benjamin, *A System of Surgery*, 1st Amer. ed., 4 vols. (Worcester and Boston, 1791), 2:207-9, or 2d Amer. ed., 4 vols. (Troy, N.Y., 1804), 2:128-29.
 (c) The same, 6 vols. (Edinburgh, 1783-88), 3:185-88.
 (d) Bruns (German translation).
 (e) Work cited.
 (f) It can be presumed that Billings used an American edition, since the British editions and the German translation cited by Bruns report the same cases in volume 3. Bell actually described three cases, not four.
2. (a) Berard: *Gazette des Hôpitaux*, April, 1846.
 (b) "Revue clinique hebdomadaire," *La Lancette française, gazette des hôpitaux civils et militaires*, 2d ser. 8 (11 Apr. 1846): 169-70.
 (c) The same.
 (d) *Half-Yearly Abstract of the Medical Sciences*, Amer. ed., 4 (July-Dec. 1846): 211 (citing "Gaz. des Hôpitaux, April 11, 1846").
 (e) See (d).
 (f) The original source is one paragraph in a miscellany of brief reports on various subjects. The operator was A. Bérard.
3. (a) Birch: Sir A. Cooper's *Lectures on Surgery*, vol. i.
 (b) Cooper, Astley, *The Lectures of Sir Astley Cooper on the Principles and Practice of Surgery*, ed. Frederick Tyrrell, 3 vols. (London, 1824-27), 1:308-9, or another edition.
 (c) See number 43.
 (d) None found citing Cooper.
 (e) Work cited.
 (f) This is the same case as that reported under Wells (no. 43).

4. (a) Blake: London Medical and Physiological Journal.
- (b) Blake, A., "A Case of Epileptic Convulsions and Hemiplegia, the Consequence of a Contusion on the Head, Cured by the Application of the Trephine: with Observations," *London Medical and Physical Journal*, 55 (1826): 103-6.
- (c) The same.
- (d) Bruns. *Medico-Chirurgical Review*, New York reprint, n.s. 4 (Jan.-Apr. 1826): 592-93. *Index-Cat.*
- (e) Bruns or *Medico-Chirurgical Review*.
- (f) Bruns noted this case but considered it not relevant, perhaps because the operation occurred shortly after the injury.
5. (a) Boucher: Dictionnaire des Science Medicales, art. Trepan.
- (b) *Dictionnaire des sciences médicales*, 60 vols. (Paris, 1812-22), 55:548 (art. Trépanation).
- (c) "Observations anatomiques," *Histoire de l'Académie royale des sciences*, 1757, pp. 28-33 (observation I, pp. 28-29, includes this and another case communicated by Boucher).
- (d) Work cited. Ploucquet. J. D. Reuss, *Repertorium Commentationum a Societatis Litterariis Editarum*, 16 vols. (Göttingen, 1801-21), 13:94.
- (e) Work cited.
- (f) The patient actually was trephined for a skull fracture and was thereupon "cured" of a pre-existing case of epilepsy.
6. (a) Boyer: Dictionnaire des Science Medicales, art. Epilepsie [1].
- (b) As above (no. 5).
- (c) Boyer, Alexis, *Traité des maladies chirurgicales et des opérations qui leur conviennent*, 11 vols. (Paris, 1814-26), 5:141-47.
- (d) None found.
- (e) Work cited.
- (f) Billings's citation is to the wrong article in the *Dictionnaire*. The case is irrelevant, since the patient was not trephined.
7. (a) Brainard (6 cases): Chicago Medical Journal, 1859.
- (b) [Brainard, D.], "Editorial: Notes of Surgical Operations," *Chicago Medical Journal*, 2 (1859): 637-42 ("Trephining for epilepsy and insanity," pp. 639-41).
- (c) The same.
- (d) *Canstatt's Jahresbericht über die Fortschritte der gesammten Medicin in allen Ländern*, 1860, 3:75. *Index-Cat.* (citing different report of same cases).
- (e) Work cited.
8. (a) Buch: Travers on Constitutional Irritation.
- (b) Travers, Benjamin, *A Further Inquiry Concerning Constitutional Irritation, and the Pathology of the Nervous System* (London, 1835), p. 285.
- (c) See number 43.
- (d) None found citing Travers.
- (e) Work cited.
- (f) This is the same case as that reported under Wells (no. 43). The operator's name is Birch, as Travers states, not Buch.
9. (a) Cadwall: Boston Medical and Surgical Journal, vol. xxvii [1].
- (b) Cadwell, F. A., "Trephining for Epilepsy," *Boston Medical and Surgical Journal*, 24 (1841): 369-70.
- (c) The same.
- (d) Smith. Bruns. *Index-Cat.*
- (e) Smith.
- (f) Smith has the same error in the author's name as Billings, but the correct volume number.
10. (a) Campbell: American Journal of Medical Sciences, vol. xii.
- (b) Campbell, H., "Cases of Epilepsy," *American Journal of the Medical Sciences*, n.s. 12 (1846): 370-72.
- (c) The same.

- (d) Smith.
- (e) Smith.
- 11. (a) Coates: *Edinburgh Medical and Surgical Journal*, 1806.
- (b) Coates, H., "Case of Epilepsy Cured by Trepanning," *Edinburgh Medical and Surgical Journal*, 2 (1806): 428-29.
- (c) The same.
- (d) Bruns. *Index-Cat.*
- (e) Bruns.
- 12. (a) Crampton: *Dublin Hospital Reports*, vol. i.
- (b) Crampton, P., "On Periostitis, or Inflammation of the Periosteum," *Dublin Hospital Reports and Communications in Medicine and Surgery*, 1 (1818): 330-57 (pp. 342-46).
- (c) The same.
- (d) None found.
- (e) Work cited?
- (f) The 1831 manuscript catalogue of the library of the Medical College of Ohio lists three volumes of the *Dublin Hospital Reports* without specifying which volumes. Photocopy from University of Cincinnati History of Health Sciences Library. The operator's name was Hewson.
- 13. (a) Dixon: *Boston Medical and Surgical Journal*, vol. xxxi [1].
- (b) Dixon, E. H., "Application of the Trephine for a Neuralgic Affection of the Cranium," *Boston Medical and Surgical Journal*, 35 (1847): 53-55.
- (c) The same.
- (d) Smith.
- (e) Smith.
- (f) Irrelevant case: the author specifically stated that the patient had no symptoms of epilepsy.
- 14. (a) Dudley (5 cases): *Transylvania Journal of Medicine*, vol. i.
- (b) Dudley, B. W., "Observations on Injuries of the Head," *Transylvania Journal of Medicine*, 1 (1828): 9-40.
- (c) The same.
- (d) Smith. *Allgemeines Repertorium*, Jahrg. 3, Heft 5 (May 1829): 114. *Annali universali di medicina*, 50 (1829): 402-5. *Summarium des Neuesten aus der gesammten Medicin*, 1 (1829): 369. *Index-Cat.*
- (e) Smith
- 15. (a) Elliott: *Transylvania Journal of Medicine*, vol. ii.
- (b) Cartwright, S. A., "Epilepsy Cured by an Operation with the Trephine," *Transylvania Journal of Medicine*, 2 (1829): 288-89.
- (c) The same.
- (d) Smith.
- (e) Smith.
- (f) The operator's name was Elliott (according to the article), which Smith misspelled "Elliot"; this suggests that Billings probably examined the original source.
- 16. (a) Farre: *Sir A. Cooper's Lectures*, vol. i., p. 170 [1].
- (b) As above (no. 3), 1:279.
- (c) The same.
- (d) Bruns.
- (e) Bruns.
- (f) The only edition found in which the case in question occurs on p. 170 of vol. 1 is the German translation cited by Bruns.
- 17. (a) Fricke: *Bruns' Chirurgie*.
- (b) Bruns, Victor, *Handbuch der praktischen Chirurgie für Ärzte und Wundärzte. Erste Abtheilung: Gehirn und Umhüllungen* (Tübingen, 1854), p. 1045.
- (c) Fricke, J. C. G., "Practische Bemerkungen für die Lehre von den Kopfverletzungen," *Annalen der chirurgischen Abtheilung des allgemeinen Krankenhauses in Hamburg*, 1 (1828): 19-87 (pp. 82-86).

- (d) Bruns.
- (e) Work cited.
- 18. (a) Gross (4 cases): Gross' Surgery, vol. ii.
- (b) Gross, Samuel David, *A System of Surgery; Pathological, Diagnostic, Therapeutic, and Operative*, 2 vols. (Philadelphia, 1859), 2:295-96.
- (c) The same.
- (d) None.
- (e) Work cited.
- 19. (a) Guild: *American Journal of Medical Sciences*, vol. iv.
- (b) Guild, J., "Case of Epilepsy, Successfully Treated by the Operation of Trepanning," *American Journal of the Medical Sciences*, 4 (1829): 96-97.
- (c) The same.
- (d) Smith. Bruns. *Allgemeines Repertorium*, Jahrg. 4, Heft 3 (Mar. 1830): 126-27. *Medico-Chirurgical Review, and Journal of Practical Medicine*, n.s. 12 (1830): 504. *Summarium des Neuesten aus der gesammten Medicin*, 3 (1829): 221-22. *Index-Cat.*
- (e) Smith.
- 20. (a) Hayward [1]: *Boston Medical and Surgical Journal*, 1838.
- (b) Hayward, G., "Trephining for Epilepsy," *Boston Medical and Surgical Journal*, 18 (27 June 1838): 325-29.
- (c) The same.
- (d) Smith (Bost. Med. & Surg. Jour. June, 1838). Bruns. *Index-Cat.*
- (e) Smith.
- 21. (a) Hayward [2]: *Boston Medical and Surgical Journal*, vol. xxviii [!].
- (b) [Ed.], "Trephining for Epilepsy," *Boston Medical and Surgical Journal*, 18 (20 June 1838): 320.
- (c) The same.
- (d) Smith (Bost. Med. & Surg. Jour. Vol. xxviii [!]. p. 320).
- (e) Smith.
- (f) The operator was Hayward. This is not the same case as the one reported by Hayward in the issue of 27 June. Note that Billings repeated Smith's error in the volume number.
- 22. (a) Hayward [3]: *Boston Medical and Surgical Journal*, vol. xxiv [!].
- (b) "Surgical Operations Performed at the Massachusetts General Hospital," *Boston Medical and Surgical Journal*, 27 (1842): 265-69.
- (c) The same.
- (d) Smith.
- (e) Smith.
- 23. (a) Hobson [1]: *Western Lancet*, vol. ix.
- (b) Holston, J. G. F., "Trephining for Epilepsy, While under the Influence of Chloroform," *Western Lancet and Hospital Reporter*, 9 (1849): 85-88.
- (c) The same.
- (d) Smith. *Index-Cat.*
- (e) Smith.
- (f) Two cases are described in this article, one fully, one briefly. Both are again described, the second more fully, in no. 24 with two additional cases. Smith cited this article for two cases and no. 24 for two. Billings apparently intended to cite this article for one case and the next for three. Elsewhere in his article, Billings refers to other cases (not treated by trephination) described in citation 24, giving the author's name correctly. It is clear that Billings examined both articles.
- 24. (a) Hobson [2 and 3] (3 cases): *Western Lancet*, vol. ix [!].
- (b) Holston, J. G. F., "Surgical Treatment of Epilepsy," *Western Lancet and Hospital Reporter*, 11 (1850): 700-707.
- (c) The same.
- (d) Smith. *Index-Cat.*
- (e) Smith.

25. (a) Howard: Transactions of State Medical Society of Ohio, 1843 [!].
- (b) Howard, R. L., "Cases in Operative Surgery," *Proceedings of the Ohio Medical Convention, 1847*, pp. 31-37 ("Epilepsy—partial hemiplegia of right side, occasioned by fracture of the skull," pp. 35-37).
- (c) The same.
- (d) None found.
- (e) Work cited?
- (f) The *Transactions* of the State Medical Society of Ohio (properly Ohio State Medical Society), which was not the same organization as the Ohio Medical Convention (also known as Medical Convention of Ohio), begin in 1846. The citation is listed in the *Index-Catalogue* under "Epilepsy (Causation of)."
26. (a) Howship: Abercrombie on Diseases of the Brain, p. 196.
- (b) Abercrombie, John, *Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord*, 2d ed. (Edinburgh, 1829), pp. 196-97.
- (c) Howship, John, *Practical Observations in Surgery, and Morbid Anatomy* (London, 1816), pp. 121-22.
- (d) Bruns (citing German translation of Howship's book).
- (e) Work cited.
- (f) Abercrombie reports on pp. 192-93 another relevant case, first described by Clossy (no. 51), which Billings did not include in his table.
27. (a) Johnson: Virginia Medical Journal, 1837 [!].
- (b) Peachy, St. G., "Epilepsy the Result of an Injury to the Skull, Cured by the Operation of Trephining. Performed by the Late Carter P. Johnson, M.D. Professor of Anatomy in the Medical College of Virginia," *Virginia Medical Journal*, 9 (1857): 307-9.
- (c) The same.
- (d) *Index-Cat*
- (e) Work cited.
28. (a) Kite: Bruns' Chirurgie.
- (b) As above (no. 17), p. 1046.
- (c) Kite, Charles, *An Essay on the Recovery of the Apparently Dead* (London, 1788), p. 244.
- (d) Bruns (German translation). Ploucquet (German translation).
- (e) Work cited.
29. (a) La Motte: Dictionnaire des Science Medicale, art. Trepan.
- (b) As above (no. 5).
- (c) Mauquest de La Motte, Guillaume, *Traité complet de chirurgie*, 2d ed., 4 vols. (Paris, 1732), 2:409-12. First edition, 1722, not available for verification.
- (d) Bruns. Ploucquet.
- (e) Work cited.
30. (a) Marchetti: Dictionnaire des Science Medicale, art. Epilepsie [!].
- (b) As above (no. 5), 55:547.
- (c) Marchetti, Pietro de. *Observationum Medico-Chirurgicarum Rariorum Sylloge* (Padua, 1664), pp. 11-12.
- (d) Bruns. Ploucquet.
- (e) Work cited.
31. (a) Mitchell: *Materia Medica and Therapeutics*.
- (b) Mitchell, Thomas D., *Materia Medica and Therapeutics* (Philadelphia, 1850), p. 722.
- (c) The same.
- (d) Smith.
- (e) Smith.
- (f) The relevance of this case is questionable, since the patient is described only as having had "nervous spells not unlike convulsions."

32. (a) Palmer: *London Medical Gazette*, vol. xvii.
 (b) Palmer, T. F., "Miscellaneous Cases in Practical Surgery," *London Medical Gazette*, 17 (1835): 220-22 ("Case III. Epilepsy from venereal enlargement of the cranium, cured by the operation of trepan," pp. 221-22).
 (c) The same.
 (d) Bruns. *Schmidt's Jahrbücher*, 12 (1836): 70. *Index-Cat.*
 (e) Bruns.
33. (a) Pancoast: *Philadelphia Medical Examiner*, 1849.
 (b) Meigs, J. A., "Epilepsy from Pressure upon the Brain (Clinic of Jefferson Medical College)," *Medical Examiner and Record of Medical Science* (Philadelphia), n.s. 5 (1849): 648-50.
 (c) The same.
 (d) Smith. *Index-Cat.*
 (e) Smith.
 (f) Pancoast was the operator. Both Smith and Billings indicate that *Philadelphia* is part of the journal title, but it is not.
34. (a) Pope: *St. Louis Medical and Surgical Journal*, vol. vii.
 (b) Pope, C. A., "Surgical Cases," *St. Louis Medical and Surgical Journal*, 7 [i.e. 8] (1850): 289-301 ("Case 4. Fracture of the cranium with depression—epilepsy—operation—recovery," pp. 293-96).
 (c) The same.
 (d) Smith. *Index-Cat.*
 (e) Smith.
35. (a) Rhodius: *Centur 1*, obs. 66.
 (b) Rode, Johan. *Observationum Medicinalium Centuriae Tres* (Frankfurt, 1676), cent. I, obs. 66, pp. 37-38, in Pierre Borel, *Historiarum et Observationum Medicophysicarum Centuriae IV. . . . Nunc Autem Aliunde . . . Accedunt Joh. Rhodii Observationes . . .*, 6 pts. (Frankfurt, 1676).
 (c) The same.
 (d) Bruns (Rhodius, *Centur. I*, Obs. 66). Ploucquet.
 (e) Bruns.
36. (a) Riboli: *London Medical and Surgical Journal*, 1826 [1].
 (b) Riboli, Timoteo, "Storia d'una terebrazione per un dolore fisso al vertice pel corso di tre anni consecutivi in conseguenza di ottite acuta, con strane forme monomaniache, e (per l'autore) incoerenti manifestazioni fisico-morali di incompleta potenza di facoltà volitiva," *Il Filiale-sebezio; giornale delle scienze mediche*, 31 (1846): 193-201.
 (c) The same.
 (d) Bruns. *Schmidt's Jahrbücher*, 63 (1849): 70-71.
 (e) Bruns.
 (f) It seems probable that Billings derived his completely erroneous citation by miscopying from Bruns the next citation after Riboli, which is "London medical and physical Journal 1826." The case is not relevant since the patient did not have epilepsy.
37. (a) Riencke: Bruns' *Chirurgie*.
 (b) As above (no. 17).
 (c) Breyer, Franc., *Dissertatio Inauguralis Medico-Chirurgica de Trepanatione Cranii in Morbis Capitis*, praeside Leopold Socrates Riecke (Tübingen, 1831), p. 17 (case 25).
 (d) Bruns.
 (e) Work cited.
 (f) Riecke's name is misspelled in Billings's table.
38. (a) Robertson: *Gazette Medicale*, 1848.
 (b) Robertson, L., "Sur l'application du trépan au traitement de l'aliénation mentale résultant d'un enfoncement du crane," *Gazette médicale de Paris*, 19 (1848): 377-78 (an abstract of the original).

- (c) Robertson, C. L., "On the Application of the Trephine to the Treatment of Mental Derangement, Consequent on Depression of the Skull," *Lancet*, 1847, 2:175-76.
- (d) Bruns (*The Lancet*.—*Gazette médicale de Paris*. 1848. pg. 377).
- (e) Bruns.
- (f) The case is not relevant, since the patient did not have symptoms of epilepsy.
39. (a) Rogers: *New York Medical and Physiological Journal*, vol. v.
- (b) Rogers, D. L., "A Case of Epilepsy, from Depression of Bone, Cured by Trephining, with Observations," *New York Medical and Physical Journal*, 5 (1826): 79-86.
- (c) The same.
- (d) Smith. Bruns. *Index-Cat*.
- (e) Smith.
- (f) Smith cited "N.Y. Med. & Phys. Jour.," which, expanded incorrectly, might be the source of Billings's error in the title.
40. (a) Steidele: *Chirurgische Beobachtungen*.
- (b) Steidele, Raphael Johann, *Sammlung verschiedener in der chirurgisch-praktischen Lehrschule gemachten Beobachtungen*, 4 vols. (Vienna, 1776-88). Not available for verification.
- (c) The same.
- (d) Bruns.
- (e) Bruns.
- (f) The existence of the work has been verified, but it has not been available for examination to verify the case and precise citation.
41. (a) Trowbridge: *Boston Medical and Surgical Journal*, vol. xxviii [1].
- (b) Trowbridge, A., "Gun-shot Wounds," *Boston Medical and Surgical Journal*, 18 (1838): 341-47 (p. 345).
- (c) The same.
- (d) Smith (also erroneously citing v. 28).
- (e) Smith.
42. (a) Warren (2 cases): *Boston Medical Magazine*, vol. i.
- (b) [Warren, J. C.], "Massachusetts General Hospital," *Medical Magazine* (Boston), 1 (1832): 93-98.
- (c) The same.
- (d) *Index-Cat*.
- (e) Work cited?
- (f) Smith (p. 234) noted that "Dr. J. C. Warren has operated twice successfully," but had no further particulars and did not give a citation.
43. (a) Wells: *Trans. of Society for Imp. of Medicine and Surgery*, 1812.
- (b) Wells, W. C., "A Case of Epilepsy and Hemiplegia, Apparently Induced by a Sharp Projection from the Inner Table of the Skull," *Transactions of a Society for the Improvement of Medical and Chirurgial Knowledge*, 3 (1812): 91-93.
- (c) The same.
- (d) Bruns.
- (e) Bruns.
- (f) The operator was Birch. This is the same case as nos. 3 and 8.
44. (a) Wells: *Essays on Pathology and Therapeutics*, by Dickson.
- (b) Dickson, Samuel Henry, *Essays on Pathology and Therapeutics*, 2 vols. (Charleston and New York, 1845), 2:464.
- (c) The same.
- (d) Smith.
- (e) Smith.
45. (a) Wurm: *Surgical Writings of Schmucker*, 1776.
- (b) Schmucker, Johann Leberecht, ed., *Vermischte chirurgische Schriften*, 3 vols. (Berlin, 1776-82), 1:252-54.
- (c) The same.

- (d) Bruns.
- (e) Bruns.
- 46. (a) Yandell: *Western Journal of Medicine and Surgery*, vol. vii [!].
- (b) Yandell, W. M., "A Case of Stricture of the Urethra, with Effusion of Urine into the Scrotum, Sloughing and Loss of a Testis; and a Case of Epilepsy in Which Trephining Was Resorted To," *Western Journal of Medicine and Surgery*, n.s. 1 (1844): 384-85.
- (c) The same.
- (d) Smith.
- (e) Smith.
- 47. (a) Yeates: *American Journal of Medical Sciences*, January, 1860.
- (b) Yeates, H. P., "Case of Epilepsy Cured by the Removal of a Portion of Depressed Bone from the Skull, Resulting from an Injury Received Ten Years Prior to the Operation," *American Journal of the Medical Sciences*, n.s. 39 (1860): 87-88.
- (c) The same.
- (d) *Half-Yearly Abstract of the Medical Sciences*, Amer. ed., 31 (1860): 54-55. *Index-Cat.*
- (e) Work cited?
- 48. (a) (Ackley) Gibbs, O. C., "On Trephining in Certain Cases of Fracture of the Skull and in Some Forms of Epilepsy," *American Medical Monthly*, 4 (1855): 121-23.
- (b) *Index-Cat.*
- 49. (a) Agnew, D. H., "A Case of Epilepsy, for Which the Patient Was Trephined," *Medical Examiner*, 12 (1856): 213-14.
- (b) *Index-Cat.*
- 50. (a) Baker, W. N., "Baltimore Infirmary: Report of Surgical Cases," *Maryland Medical and Surgical Journal*, 1 (1840): 187-99 (pp. 196-97).
- (b) *Index-Cat.*
- 51. (a) Clossy, Samuel, *Observations on Some of the Diseases of the Parts of the Human Body* (London, 1763), pp. 17-18.
- (b) Bruns.
- 52. (a) Coats, B. F., "Epilepsy Caused by Compression of the Brain, Successfully Treated by Trephining," *Cincinnati Lancet and Observer*, 1 (1858): 720.
- (b) *Index-Cat.*
- 53. (a) Dudley, B. W., "The Use of the Trephine in Epilepsy," *Transylvania Journal of Medicine*, 5 (1832): 132-33. (Dudley's 6th case).
- (b) Smith. *Allgemeines Repertorium*, Jahrg. 9, Heft 6 (June 1835): 147. *Index-Cat.*
- 54. (a) Dudley, E. L., "A Case of Epilepsy Cured by Trephining the Scull," *Transylvania Medical Journal*, 3 (1851): 85-89.
- (b) *Index-Cat.*
- 55. (a) (Duret, Louis) Houllier, Jacques, *Omnia Opera Practica, Doctissimis Ejusdem Scholii et Observationibus Illustrata; Deinde Lud. Dureti in Eundem Enarrationibus, Annotationibus, et Antonii Valetii Exercitationibus Luculentis* (Geneva, 1623), pt. 1, p. 101.
- (b) Temkin, Owsei, *The Falling Sickness: A History of Epilepsy from the Greeks to the Beginnings of Modern Neurology*, 2d ed. rev. (Baltimore: Johns Hopkins Press, 1971), pp. 186-87.
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- (b) *Index-Cat.*, citing abstract in *Southern Medical and Surgical Journal*, n.s. 10 (1854): 506.

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- (b) Bruns. *Allgemeines Repertorium*, n.F., Jahrg. 1, Heft 7 (July 1837): 1-2. *Schmidt's Jahrbücher*, 16 (1837): 315. *Summarium des Neuesten und Wissenswürdigsten aus der gesammten Medicin*, n.F. 6 (1837): 359-60. *Index-Cat.*
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61. (a) (Unnamed) Mott, V., "Professor Mott's Lectures on Surgery, No. III," *New York Lancet*, 1 (1842): 33-35.
- (b) Copland, James, *A Dictionary of Practical Medicine*, ed. Charles A. Lee, 3 vols. (New York, 1859), 1:941.
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- (b) *Neues Repertorium der gesammten deutschen medicinisch-chirurgischen Journalistik*, Jahrg. 1 (1845), Bd. 1, Specielle Pathologie und Therapie, col. 422. *Schmidt's Jahrbücher*, 51 (1846): 291. *Index-Cat.*
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"Index Medicus" in the Twentieth Century

Frank B. Rogers

In introducing the *Index Medicus* in 1879, John Shaw Billings remarked that he felt sure that it might "expand beyond anything now promised." That prophecy has been amply fulfilled in this century, but in its first twenty years the *Index Medicus* was held to a stormy course. Never were there as many as five hundred subscribers, and even of these almost 20 percent were subscriptions paid for by the United States Army. Subscription rates fluctuated widely, publishers came and went, and from time to time (and as early as December 1884) there appeared announcements to the effect that "with this issue *Index Medicus* will cease to be published." But Robert Fletcher, who had devised the snappy title in the first place, kept plugging away at his editorial tasks. Beginning with a base of about 600 journals and a little over 20,000 articles for the 1879 volume, the publication steadily expanded until it was covering about 35,000 articles in 1899, the year it finally did collapse from lack of funds.

For three years, only *Bibliographia Medica*, published in Paris, filled the gap. Then in 1903 the *Index Medicus* resumed with the financial backing of the newly formed Carnegie Institution of Washington, on whose board of directors Billings was serving. That there was a waxing interest in bibliography is reflected in other developments. In 1895 Otlet and LaFontaine in Brussels were hatching large schemes for international bibliography, and the Royal Society held a conference in London which resulted in the publication of the *International Catalogue of Scientific Literature* between 1902 and 1921. The *Reader's Guide* began publication in 1901. *Chemical Abstracts* was started in 1907. And the *Index Medicus* kept rolling.

As we have heard, the *Index Medicus* was a companion to the *Index-Catalogue of the Library of the Surgeon-General's Office*. The difference in structure between the two is noteworthy. While the *Index-Catalogue* listed its entries under author and subject rubrics arranged in a single alphabetical dictionary array, the *Index Medicus* was classified according to broad subjects, with a separate author index furnished annually. Thus, when Charles Darwin published an article entitled "Inheritance" in *Nature* in 1881, it was duly listed in the *Index Medicus* three months later under the section designated "Biology: Anthropology and Ethnology,"

whereas it appeared in the *Index-Catalogue* volume of 1885 under the term "Heredity."

Both *Index Medicus* and *Index-Catalogue*, however, listed entries under a single subject only. In this sense both publications exhibited classified arrangement—the *Index Medicus* with the hierarchies of classification made explicit, and the *Index-Catalogue* with a looser, more distributed pattern of the type called by bibliographers "alphabetico-classed." The reason for the divergence in practice was the differing size of the corpus to be indexed in each issue of each publication. The *Index-Medicus* appeared monthly, and each monthly issue of, say, 2,000 entries covered the entire gamut of the subject classification. Any given volume of the *Index-Catalogue*, on the other hand, would cover about thirty times as much material, over a span of only about one-twentieth of the subject classification. Under this system the *Index Medicus* could be carried through its final assembly very rapidly—Garrison tells us that Fletcher could, when hard pressed, perform this task in a single night. For a publication emphasizing its function as a current awareness tool, rather than one for retrospective search, this feature is important.

The great strength of the relationship was that of a single database parlayed into a double publication. The great weakness of the actual operation was a workflow which required handwritten duplication of the card entries solely for the purpose of forwarding the second publication, and a subsequent editorial rehandling of the duplicate batch.

In 1916 there appeared, under the auspices of the American Medical Association, the first volume of a new publication called the *Quarterly Cumulative Index to Current Medical Literature*. It covered 150 journals, and about 10,000 articles. Most significantly, it was in an alphabetical dictionary arrangement, authors and subjects together. In fact, it was somewhat like the *Index-Catalogue* in this respect, but only somewhat. The *Index-Catalogue* did not index the authors of periodical articles at all, and it classed its articles under just one subject. The secret of the *Quarterly Cumulative Index* was that it was free to use, and it did use, the device of listing an article under several subjects. Quarterly issues were merged with succeeding issues, and these cumulations required the construction of no special indexes.

For ten years the *Quarterly Cumulative Index* continued. It quickly increased its coverage to about 300 journals and 25,000 articles, at a time when the *Index Medicus* was covering 45,000. It was a great success; the peculiar thing is that its story, in anything beyond broad outline, has really never been told. The *Quarterly Cumulative Index* and its successor publication were the work of three remarkable women who carried them on over a period of forty years—Helen Hutchinson Green, Marjorie Hutchins Moore, and Magdalene Freyder Hodgson. Theirs was an

uncommon achievement. I hope there is an eager feminist historian somewhere who will grab this hint.

Fielding Garrison, who had succeeded Fletcher as editor of *Index Medicus*, was impressed by at least some of the points of the *Quarterly Cumulative Index* demonstration. The second series of the *Index Medicus* was closed in 1920, and a third series was begun in 1921, which used two salient features of the *Quarterly Cumulative Index* plan. It was issued quarterly, and in a dictionary arrangement of subjects. But *Index Medicus* did not cumulate, its sole author approach was a separate annual author index, and articles were still distributed under single subjects only.

Garrison, after more than thirty years on the job, increasingly burdened by a staggering workload, in poor spirits following an unhappy tour of duty in an overseas post, and longing for retirement, entered into discussions with Dr. George H. Simmons and Dr. Morris Fishbein at the American Medical Association which eventually resulted, in 1927, in the merger of the *Index Medicus* with the AMA's *Quarterly Cumulative Index* to form the *Quarterly Cumulative Index Medicus*, with continuing subsidy from the Carnegie Institution. For five years, until 1932, the Library contributed most of the indexing of foreign material. After that time, the Library's participation and the Carnegie's subsidy ceased. Now the American Medical Association was the sole proprietor of the *Quarterly Cumulative Index Medicus*, and the Library was solely occupied with the *Index-Catalogue*. QCIM continued to thrive. By 1939, it may be estimated, it was indexing almost 90,000 articles.

During World War II the Library, through its "Friends" organization, began to publish a weekly listing of the tables of contents of medical journals under the title *Current List of Medical Literature*, as a sort of current awareness device and order catalogue for microfilm service. This publication caught on at once. In 1948, when the Library was publishing both the *Index-Catalogue* and the *Current List*, Col. Joseph H. McNinch, then Director of the Library, organized an advisory committee to study those indexes, and established under Dr. Sanford Larkey at the Welch Medical Library an indexing inquiry which would serve as the research arm of the committee. The major question before the committee was that of continuance of the *Index-Catalogue*, a question which had been studied off and on for thirty years; by 1948 the situation had become desperate, with over one and three-quarters million bibliographical entries in the unpublished backlog. After prolonged deliberations, the advisory committee recommended bringing the *Index-Catalogue* to a close. This was done, and most of the manpower that had been employed in the *Index-Catalogue* operation was transferred to the staff

of the *Current List*. In 1950 the *Current List* was totally reorganized as a monthly journal with cumulative features. Its ingenious system of page make-up through shingling together paper slips resulted in maximum cost-effectiveness in production, and timeliness of composition and publication.

Meanwhile, out in Chicago, the *Quarterly Cumulative Index Medicus* was having a very difficult time, the result of wartime delays in receipt of material, loss of trained indexers, printing slowdowns, rising costs, and the accumulation of massive backlogs. By the mid-1950s, the *QCIM* was no longer quarterly nor cumulative, but was three years behind in publication of the half-yearly volumes, despite a decrease in size, and as the months passed there seemed little prospect of its ever catching up. In this crisis the *Current List*, despite what were format defects from the users' standpoint, grew in importance because of its currency.

During the fifties, when I was Director of the Library, I held discussions with Dr. Austin Smith, then editor in charge of scientific publications at the American Medical Association, in which I suggested a division of labor between the Library and the Association in the production of a single index to replace *QCIM* and the *Current List*. I was aware that the AMA was not only concerned about the publication lag of *QCIM*, but was also distressed at the financial drain the index represented. Divisions of labor along geographic, or linguistic, or subject lines were examined, but the AMA found no proposal acceptable until the successful completion of the Listomatic camera system at the Library was imminent. This system, devised by Seymour Taine and sponsored by Verner Clapp's Council on Library Resources, utilized punched cards, collators, sorters, Flexowriters, and a high-speed step-camera, and was being readied for use in the production of the Library's index. It made feasible an arrangement whereby the American Medical Association could continue to be identified with the index publication by acting as entrepreneur for the distribution of the annual cumulated editions, which were to be compiled by the mechanized operation at the Library. And so the agreement was made, and the *Quarterly Cumulative Index Medicus* and the *Current List* faded away, and in January 1960 the original title, *Index Medicus*, and the original Library editorial office were back together again after a separation of thirty-three years. By the mid-sixties, the AMA relinquished its last responsibilities for the cumulations.

In the 1950s there were some significant advances made in the theory of subject bibliography—embodying not a nice, tight, overall theory, but at least suggesting new approaches and furnishing some promising new concepts. Calvin Mooers came up with his notion of the "descriptor," which cynics said was merely a synonym for subject

heading. What the descriptor is is a special kind of subject heading; the significant point is that it was Mooers's detailed spelling-out of its special characteristics that threw a whole new light on the problems of subject analysis. Then Mortimer Taube began talking about coordinate indexing, and the use of Boolean expressions of symbolic logic to indicate subject relationships, and the distinction between direct and inverted files. H. P. Luhn published papers on sophisticated coding techniques, automatic abstracting, and the development of keyword-in-context indexes. Cyril Cleverdon and his group in England, working on a comparative evaluation of retrieval systems, hit on the notions of precision and recall as criteria of measurement of retrieval effectiveness. And Eugene Garfield began expounding his wild ideas about the usefulness of citation indexing in the sciences, and was later to exploit those ideas in an astonishingly versatile way.

In the midst of all this ferment, and no doubt partly as a result of it, and even as the new Listomatic operation was just getting underway, the Library was drawing up specifications for a retrieval system to be designed around the capabilities of the digital computer. In the design and operation of the Listomatic system, we had been preoccupied with the composition and printing component, and we finally came to realize that it was not going to be feasible to try to graft a mechanized retrieval system onto it. We concluded that it would be necessary to reverse the priorities, that is, if we wanted to realize success in both components, it would be more suitable to start with the design of a retrieval system, and then to proceed with the publication system as the subsequent and derivative problem. That indeed turned out to be the hinge and crux of the matter. It has sometimes been implied that all this is merely a play on words and a trivial and unimportant question of word order. That is not so; the proposition may now appear to be self-evident, but it was far from being that when it first hove into view twenty years ago.

The first commercially available general purpose computer had been delivered to the United States Census Bureau only a decade earlier, but, early on, the new machine was being tried out in bibliographical applications, particularly in defense-related areas. The Library, with the persistent prodding of Dr. Michael DeBakey, and the financial support and encouragement of the National Heart Institute, undertook its MEDLARS project, and eventually brought up the system in 1964. Whereas the last volumes of the *Quarterly Cumulative Index Medicus* were covering about 60,000 articles annually, and the *Current List* in 1958 had reached 110,000 articles, by 1968 the new *Index Medicus* was covering more than 200,000 articles. And besides that, it was serving as a comprehensive database from which two dozen other publications were derived. And besides that, it was functioning as a mechanized informa-

tion retrieval system, with the computerized information files being queried directly. In 1965, 1,800 computer searches were performed, and six years later this figure topped 18,000. A whole new dimension of bibliographic service was made manifest.

In this last decade, the old MEDLARS system, which was tape-oriented, has metamorphosed into MEDLINE, an online system made possible by the advent of a communications network of long lines leased under favorable rate structures, cheap fast terminals providing dependable service, and large direct-access storage devices which now at the National Library of Medicine provide a capacity of ten billion characters of bibliographic data. Dr. Cummings and his staff have directed the growth of the MEDLINE system to a flowering which is nothing short of spectacular. There are now more than 800 terminals in the MEDLINE network, and they are handling over a half million requests from the *Index Medicus* database, which is now adding 250,000 articles a year from 2,500 journals.

Furthermore, MEDLINE is now but one of a whole national constellation of online bibliographic systems, now numbering more than 300, containing fifty million different records, and being tapped for several million searches each year. Access to these databases is made available in the United States mainly through a half dozen commercial suppliers, each handling multiple databases. One such supplier currently advertises a file containing "twenty million abstracts, and growing." Indeed, the field is now mature enough to have its own international journal, the *Online Review*.

It seems clear that 1979 is pretty far down the pike from 1879, with or without the numerous parallelisms, and this should lead us to expect that another score of years will distance us even further. I surmise that the internal arrangement of the *Index Medicus*, which has changed so much over the years, will change some more. In the first third of its first century the *Index Medicus* adopted and used an explicit classification scheme. In its middle years, it slipped almost unwittingly and imperceptibly into a looser array of alphabetically arranged subject headings. In the last years the *Index Medicus* has frankly pursued the principles of coordinate indexing, within which it has demonstrated to a highly sophisticated degree the use of a controlled indexing vocabulary, of which I have been a strong proponent. But further change is bound to come, and I would guess that this is likely to be in the direction of natural language indexing, which depends on computer analysis and manipulation of words appearing in titles and short abstracts. The factors which make this all but inevitable lie in the huge volume of materials to be indexed and in the decentralization and farming-out of the indexing process which have resulted. A thoroughgoing exclusive reliance on a con-

trolled vocabulary for indexing becomes, in the face of such mass and such dispersion of control, an extremely fragile thing. I doubt that it can survive unmodified. It has, in fact, already been modified. The "string-search" capability of the MEDLINE system has proved highly successful; the slide in this direction is bound to become more pronounced, although I would not expect the controlled vocabulary totally to disappear—so long as there is a printed *Index Medicus*, so long as principles of user convenience dictate the finding of the complete entry (rather than a mere abbreviated address) at the initial stage of search, and so long as that silent fraternal twin, the printed book catalogue, is peeking from the wings.

In such a situation one would hope for further developments in the theory of bibliography which would serve as rational practice guides. But much of the theoretical discussion we have been getting appears to me to be suspect. If not all too obviously self-serving, it is frequently trapped in excessive artifice and obfuscation.

As the mode of internal arrangement is likely to change, so is the style of external presentation. We have seen how modes of delivery of the *Index Medicus* have varied throughout its history. It has been published monthly, and it has been published quarterly; it has been cumulated at six-month intervals, at yearly intervals, and not at all. It was early only the twin published product, and later the sole published product, of the operation which sustained it, while now it has dozens of sibling publications. In an earlier day publication in printed form provided the sole means of access to the bibliographic store; in our time, online retrieval services have grown so enormously that one may occasionally wonder what fragments of an audience can be left for printing publication to cater to. For a suggestive analogy of sorts, not least in its capacity to shock, we have only to look at the recent decision of the large research libraries of this country to close out their old card catalogues in favor of new catalogues embedded in online retrieval systems. Only a few years ago the card catalogue could hardly be conceived of as anything but a permanent fixture, yet even now we are beginning to dismantle it.

I do not foresee the demise of a printed version of the *Index Medicus* store; I do, however, believe that inevitably we must see radical changes in the periodicity of publication, and at the same time marked changes in the shape and configuration and relationships of the *Index Medicus* family membership—the *Index Medicus* siblings and all the *Index Medicus* children, and the cousins, too. It is bound to happen that some of them are going to have their lease on printed life rescinded, and will remain only as ghosts within the machine.

There are few things that last for a century any more. Only a very few of the original *Index Medicus* journals are still being published today. Seventy percent of our extant medical journals date only from the post-World War II era. The card catalogue seems about to disappear. The Secretary of Health, Education, and Welfare announces that we have arrived at a period when physicians are in over-supply, and that he hopes that during the next few years the medical schools will reduce the size of their classes. Strange new subject headings appear in the *Index Medicus*, such as "Extrachromosomal Inheritance," which has been around for the last decade, and is now apparently legitimized in the publication of *Plasmid: An International Journal Devoted to Extrachromosomal Gene Systems*, just admitted to the *Index Medicus* club. Upheavals of such magnitude are shaking the foundations.

Things do change, within and without the Library, but our centenary index continues to look very healthy indeed. As Billings once said, "the prospects have changed somewhat within the last years; there is a new literature, a new pathology . . . and new names for some very old things . . . but the old records have not lost all interest, and the special value of the library is that it contains both the old and the new." The *Index Medicus*, old or new, old and new, remains, and we salute it as it embarks on its second century.

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Part II: The Physician and His Books

Some Libraries I Have Known: The Care and Feeding of Readers and Books

William B. Bean

I am honored and made joyful to be able to help celebrate Billings and the hundredth birthday of *Index Medicus*, that divine conjunction of physicians and books. I will discuss somewhat at haphazard what some books, libraries, and people have meant to me with what I hope is an appropriate emphasis on Walter Reed, who, for the twenty-three tragic last days of his life before he died on November 23, 1902, was the director of the Library of the Surgeon General's Office, now the National Library of Medicine. I will begin with some memorable words of Virginia Woolf:

When the Day of Judgement dawns . . . and the great and humble come forward to receive their rewards . . . the Almighty will turn to Peter and will say not without a certain envy when he sees us coming with our beloved books under our arms "Look, these need no reward. We have nothing to give them here. They have loved reading."

Some autobiography is really fiction. No person can choose his parents or select his ancestors. Thus, I was blessed with having been brought up in a family where hundreds of books formed an essential part of the natural habitat. Most I had looked into and many I had read before I went away to Episcopal High School in Alexandria, Virginia. I knew my way around in the splendid eleventh edition of *The Encyclopaedia Britannica*. I had followed my great-uncle Elisha Kent Kane through three volumes telling of two Arctic explorations in the 1850s in search of Sir John Franklin. I had looked at and read parts of Brady's gruesome photographic history of the Civil War. That was not so fearful as the large volumes of *The Medical and Surgical History of the War of the Rebellion*, the title of which greatly vexed my Virginia born and bred father. These were in addition to classical works of English and American prose and poetry. Since books were an ever-present part of what Sherrington called the surround, I became and remain a voracious reader.

My first visit to the Library of the Surgeon General's Office occurred in the late 1920s when I was at school in Alexandria. Some of the more morbidly curious of us used to visit the old Army Medical Museum to look at the human wreckage of war, both real specimens and wax models of human destruction and disaster. The library was in the same "Old

Red" building, right across the hall from the museum. I wandered over there, sometimes searching for a special book and sometimes just idly curious. On more than one occasion a very soldierly looking elderly gentleman came to my assistance. Only much later did I realize that this had been Fielding Garrison, whose connection with the library and its indexes is well known.

As time went on, I became thoroughly familiar with the general library at the University of Virginia and soon with its medical library. When I interned at Johns Hopkins, the Welch Library was a great place for a roaming, browsing campaign, as I learned the hard way how to find books and references. During my year at Thorndike, on a number of occasions I visited the Boston Medical Library, which now forms part of the marvelous Countway Library. The medical library at the Cincinnati General Hospital was just downstairs from the residents' quarters in the main administration building. I picked up a few duplicates of fairly rare books at a time when the city library turned over to the college of medicine all its medical volumes. The duplicates were sold for a song. I began to buy books at secondhand book stores. Smith's Acres of Books in Cincinnati led me to several editions of Osler's textbook, the fifth edition of *The Gold-Headed Cane*, and some Daniel Drake material I could afford as a senior resident on a salary of \$350 per annum. At Iowa, I quickly made friends with Miss Frohwein and later Bob Crider and David Curry and had a behind the scenes role in helping John Martin realize it was wise for him to give his fabulous collection of old medical books to what is now the John Martin Rare Book Collection in the Health Sciences Library.

I could spend a whole evening talking about the Osler Library at McGill and my encounter with Willie Francis; or the Radcliffe Science Library at Oxford, where the Daniel Press still functions; or the whole day I spent with the Burton books at Christ Church College, Oxford, near where Osler had his room. I was able to look at most of the books that Burton used to produce *The Anatomy of Melancholy*, annotated in Latin, Greek, Hebrew, and what I take to be Burton-ese. There were, of course, many visits to the Bodleian Library, Osler's favorite.

To give my comments more cohesion, I ask you to follow me along the trail of collecting Walter Reed's papers and writing his biography. The first series of studies I did on Walter Reed were in the Henchs' collection in the Alderman Library at the University of Virginia. But a great many Reed items are in Washington. The National Library of Medicine has some of the Reed-Sternberg correspondence and a volume of separately typed lectures Reed gave his students at the Army Medical School between 1893 and 1902. He also used the lectures for his night

course for the students in the Medical Department of Columbian University, now George Washington.

My association with the National Library of Medicine has also opened up the way to other Reed material. When I was a member of the Board of Regents in 1968, during the year I had begun to work on the Reed papers in Charlottesville, I told the story of Reed's life at a library banquet. A number of people connected in some way with Walter Reed were invited, including Reed's granddaughter, Daisy Reed Royce, and her husband, Maj. Gen. Charles Royce. From her I got all manner of helpful information, including a series of homesick letters her father had written as an eleven-year-old from Tuscaloosa, Alabama, where he had been shipped off to boarding school from Mt. Vernon Barracks near Mobile. Mrs. Eileen Gorgas Wrightson, the delightfully spry and then still active daughter of Gen. William C. Gorgas, put me on the trail of her father's correspondence with Walter Reed, which ultimately Brad Rogers helped me locate. Dr. Daniel Borden—he is the son of William Borden, who operated on Walter Reed for what proved to be fatal appendicitis when it led to peritonitis—told me of many of his own recollections of Walter Reed and gave me several important books. Mrs. Crosby Roper and her husband were present. As Laura Wood, she wrote by far the best biography of Walter Reed, even though it was listed as a book for juveniles.

Quincy Mumford, then librarian of the Library of Congress, was a member of NLM's Board of Regents. He told me his library had nothing on Walter Reed, even in Leonard Wood's papers. But he gave me access to them for a couple of hours on a holiday when the library was closed and I found two letters from Walter Reed congratulating Leonard Wood on his promotions. In the same box was a similar one from William Osler. At the Walter Reed Hospital, I found, with the help of Charles Royce, Walter Reed's account book listing all his expenditures during the first five years of his marriage, a helpful verifier of the Reeds' perennial difficulties with money.

The Armed Forces Institute of Pathology, lineal descendant of the old Army Medical Museum, of which Walter Reed was Curator, has much material, including floor plans of Walter Reed's office and laboratories in the old Army Medical Museum and Library building. There is still some unsorted material where it is possible, but unlikely, that Reed letters may be found.

The library of the Medical Society of the District of Columbia kept superb minutes of the society's meetings, hiring a professional stenographer for that purpose. Some of these were published in unlikely journals. They are all available in their original form and reveal the remarkable activity of Walter Reed in presenting many papers, including

the yellow fever story, and many brief or long discussions, including lively comments on diphtheria, rabies, tumors, infections, and diseases of many organs and systems of the body.

The great source of hitherto untapped Walter Reed material was in the National Archives. There I found masses of material dealing with the camps and forts where he served. There are several camp surgeon's letterbooks with copies of all letters going in and out of the surgeon's office; Walter Reed's personal files; official records from the camps and forts during Walter Reed's terms of duty. His personal records I got permission to study from Daisy Royce. Probably I obtained from the National Archives and its helpful staff more material than from all other sources added together.

From the Welch Library in Baltimore I got some of the documents of William Henry Welch in correspondence with Walter Reed, but more help from Dr. Thomas Turner, who had edited the most recent history of Johns Hopkins. It was mainly about the line of transfer of ideas about hoof and mouth disease. Welch had just read the work of Friedrich Loeffler and Paul Frosch in Germany and immediately got in touch with Walter Reed and his group while the yellow fever experiments were going on in Havana. Under Reed's direction, James Carroll tested the blood taken from a person during the first three days of the disease when viremia prevailed. It was infectious when injected into a volunteer. Of more importance, the ultrafiltrate, free of bacteria and thus sterile in the ordinary meaning of the term, produced the disease also.

The splendid library of the New York Academy of Medicine contains the second notebook of Jesse Lazear. Laura Wood had uncovered it there and I got copies, with the assistance of the always helpful Gertrude Annan and Saul Jarcho. The important original pocket notebook of Lazear's disappeared, removed from Walter Reed's office on the night that Reed died. It had provided Reed with an essential clue in unraveling part of the mystery of the mosquito in yellow fever.

At Rochester, New York, after I had given a lecture on yellow fever, someone in the audience came down for a discussion. He had worked in the army in Walter Reed's old office. When they were clearing out desks, he came across a couple of Reed's letters which he gave to me. I passed them on to the collection at the University of Virginia. Though minor, they present interesting observations of routine. One was an emergency order for roach powder. The other was to a well-known optical company saying that Reed would not pay personally for the microscope the company had given as a demonstration piece for advertising purposes. While I was in Rochester, the librarian of the medical school library showed me the first Walter Reed prescription I had seen. Since then I have obtained and made copies of others collected by an ambitious and thoughtful

druggist, Galen King, from Crawford, Nebraska, a town near Fort Robinson, where Reed spent three years in the 1880s. I have also had much help from the librarians and archives of the Nebraska State Historical Society at Lincoln.

The general library of the University of Iowa has complete files of the *Army and Navy Journal* and complete records of the transactions of each session of Congress, which include the formal annual reports of the Surgeon General to the Secretary of War. Here I came across Walter Reed's buried and largely forgotten studies on malaria. The help from these as well as many other army records made it convenient to accomplish a great deal. My secretary, Phyllis Shay, would lug the huge volumes right into my office.

The librarian of the Cushing rare book collections at Yale gave me copies of the letters in the Cushing-Reed correspondence, some of which Cushing had used in his magnificent biography of William Osler.

Once when I had lectured on Osler in Minneapolis, Owen and Sally Wangenstein called my attention to a series of letters that William Worral Mayo, the father of the famous Mayo brothers, had written from a sabbatical year he spent at Bellevue Hospital Medical College when he was forty-nine and when Walter Reed was there, an eighteen-year-old student. The letters, published in the Rochester, Minnesota, paper, give an extraordinarily vivid and widely ranging picture of the sights and scenes, the churches and preachers—including the lusty and lurid Henry Ward Beecher—the buildings, the concerts, the lectures, the theatre, and the shocking contrast of great wealth and great poverty in the roaring and exploding enthusiasm of post-Civil War New York City.

Once when I was lecturing at Vanderbilt on Walter Reed, I asked Dr. Harry S. Shelley and the medical librarian to show me their rare books to see if there was anything on Walter Reed. They did not remember any Reed items, but, to my astonishment, in the yellow fever section I came across Walter Reed's Spanish Bible, which he had bought when he was at Fort Apache, Arizona, in the 1870s. The Bible had been presented by Tinsley Harrison's father who, during the 1920s, when Tinsley was professor of medicine at Vanderbilt, lectured every week on medical history, coming at his own expense from Birmingham to Nashville. He greatly admired Walter Reed and had obtained the Bible from Walter Reed's widow, who did not wish to part with any of Walter's letters. Entered in it, in Walter's handwriting, are his name, his wife's name, and his two children's names. Under each, written in Spanish, is the date of birth. The names of his two children underwent interesting transmogrifications. His daughter was christened Emily Mabel Reed. When she signed her name in later life, on formal documents it was Emily Lawrence Reed. Almost always she was called

Blossom Reed. After her unhappy marriage was dissolved, she was known as Mrs. Blossom Reed. The name Blossom was given to her as a three-year-old when a soldier asked her what her name was and she referred to a flower she was holding and said, "Blossom." The Reeds' son was christened Lawrence Reed. He shifted through curious stages: W. Lawrence Reed, Walter Lawrence Reed, Walter L. Reed, and finally, simply Walter Reed, which was what he used when he was Maj. Gen. Walter Reed, the inspector general of the army in the latter part of the 1920s and the 30s, between the two World Wars.

Though I have not visited the University of Alabama library at Tuscaloosa, it has five letters from the Reed-Gorgas collection, the whole being extremely valuable in demonstrating how the surgeon general tried to take the credit for the mosquito-vector hypothesis demonstrated by the Reed board, when in truth he had expressly told Walter not to work on the mistaken idea that Carlos J. Finlay had about yellow fever and the *Aedes aegypti* mosquito.

Not exactly connected with the Walter Reed material, but bearing closely on yellow fever, are two quite separate libraries. One is that of the College of Physicians of Philadelphia, to which William Osler and Weir Mitchell gave or helped get their generous colleagues to give many books. The museum, library, anthropological collection of skulls and skeletons are really great, but perhaps my favorite—leaving out the kidney stones passed by Chief Justice Marshall and the glass jar with the tumor removed from the roof of President Theodore Roosevelt's mouth—is the soap mummy. This was discovered decades ago in Philadelphia during the grading for a new road. The soap mummy was originally an adipose victim of the fearful Philadelphia yellow fever epidemic of 1793. She had been buried in a mass grave. Her overabundant fat, through the process of adipocere formation, produced a calcium soap cast of her body which withstood the vicissitudes of time to give us a macabre reminder of that dreadful and devastating epidemic so vividly described for us in John Powell's splendid book, *Bring Out Your Dead*.

The last library connection concerns a book I got from Chauncey Leake, who had a number of productive years as a member of the Association of Honorary Consultants of the then Army Medical Library. I told him I needed a copy of his splendid reissue of Ashbel Smith's *Account of the Yellow Fever Which Appeared in the City of Galveston . . . 1839*. On the flyleaf, Chauncey made a nice inscription for me in his optimistically ascending flamboyant handwriting. When I looked on the second page I found that he had said almost the same thing many years before when he had presented the book to his brother. At least according to Chauncey, his brother had probably never read it and

certainly would not miss it, so he had removed it from his brother's books and sent it on to me for my great pleasure.

I conclude with some thoughts from my talk at the dedication of this library twenty years ago:

Books remind us of friendship. They lead us to equanimity and peace, at least peace of mind. They help us maintain our individuality without the austere and crushing loneliness of those who love only themselves. The wisdom we gain from books leads us to act as though we were building our ideas for eternity, mindful that the nature of life and death are so ordered that we and our works are fleeting and falling grains of sand in the hourglass of time. If we can avoid the apathy of those who claim to know that nothing matters and the sheer folly of those who know that they personally matter immensely, we shall have been worthy successors to that silent company of physicians, our medical forebears whose spirits watch over us here. Through the careful and scholarly making and the wise use of books and libraries they built our great tradition. By following them we must add to it as physicians wise and humble in the care, the comfort, and sometimes in the cure of our fellows in their sickness and in their sorrow.

Acknowledgments

If I were able to list everybody who has helped in my career and everybody thus responsible for my being here at the celebration of the founding of *Index Medicus*, the list would be longer than the talk. A few must be named: my wife and family for their cheerful forbearance and help; help from secretaries and editorial assistants, Phyllis Shay in Iowa, Beverly DeVries and Dodie Meeks, in Galveston; the whole staff of the National Library of Medicine; Reed relatives, family members and associates and the intellectual stimulus from my students, associates, and companions in the love and care of books.

Medical Books in Colonial Philadelphia

Edwin Wolf 2nd

The Loganian Library on May 1, 1794, opened to the public in its new quarters, an east wing added on to the Library Company of Philadelphia's two-year-old building on Fifth Street across from the State House Square.¹ Dr. William Barnwell, who during the yellow fever epidemic of 1793 had claimed experience with disorders of the warmer climates, did not take long to discover the large and fine collection of medical books housed in Library Hall. Only eight weeks after the Loganian books were made available, he borrowed Spiegel's works in Latin and Le Clerc's *Histoire de la medecine*.² Barnwell was probably working on his *Physical Investigations and Deductions*, concerned with "diseases of a warm and vitiated atmosphere," which was published in 1802.³ He is recorded as having borrowed more books before the end of the century than any other physician. His needs apparently were varied, ranging from Bonet's pathological anatomy to Morgagni's *Adversaria Anatomica*, from the collected works of Paré and Rivière to Piso's study of the natural history and medicines of the East and West Indies, as well as Glisson's monograph on the stomach and intestines and the pathologist Lieutaud's elements of physiology.⁴

We have no idea what men read what books in the library room, for no record was kept of use *in situ*. However, in the loan book of the Loganian Library appear the names of two older physicians connected with the medical school of the University of Pennsylvania, Caspar Wistar, Jr., and Adam Kuhn.⁵ Wistar was fined £2 for keeping out for twenty weeks Wepfer's post mortem observations on persons who had died of apoplexy.⁶ With good records for prompt return were some younger men, recent graduates of the school, Edward Cutbush, Charles Caldwell, James Woodhouse, and Thomas Chalkley James.⁷ Among the works they borrowed were a somewhat esoteric work for eighteenth-century Philadelphian use, Cleyer's account of Chinese medicine; Cockburn's *Sea Diseases*, with a section on bleeding, considerably more relevant to eighteenth-century Philadelphia; and both Fracastoro's and Botallo's *Opera*.⁸ These men were using one of the largest collections of medical books in the United States. You will look in vain in medical histories for material on the Loganian Library or Library Company, although a hint was given in a history of the Pennsylvania Hospital.

"Although the Managers could justifiably boast their library housed the best medical collection in the nation," William H. Williams wrote, "the Board wished to make other collections available to the physicians and, in 1799, purchased a share in the Library Company of Philadelphia."⁹ The Hospital's library ballooned in the last decade of the century from a meager 500 or so volumes in 1790 to 1,700 by 1801.¹⁰ Its additions were of more modern texts than the large selection in the Loganian Library.

It is recognized that thanks to its Almshouse, Pennsylvania Hospital, American Philosophical Society, medical school, and considerable number of competent practitioners, Philadelphia had become by the end of the eighteenth century the center of American medical practice and education. It has not been recognized that after the first quarter of that century medical books were far more commonly available in public and private libraries than historians have noted.

The earliest record of the ownership of medical books in Philadelphia was not very informative. The inventory of the estate of John Jennings, merchant, in 1688 only noted "six physick books," and a later one of Henry Carter, brickmaker, in 1709 included "three physick and two other books."¹¹ In a parcel of books sent by the London publishers, Awnsham and John Churchill, to William Penn for sale in his province in 1700 were included Gibson's anatomy, Culpeper's well-liked and well-used herbal, *The English Physitian Enlarged*, the single most popular medical manual for laymen of its day, and that same physician's *Pharmacopoeia*.¹² John Guest, a justice of the Supreme Court of Pennsylvania who died in 1708, had owned a somewhat curious work for a learned jurist, Blégný's *New and Curious Observations on the Art of Curing the Venereal Disease*.¹³ John Jones, merchant, who died the same year, had Cole's folio edition of Rivière's *Rationall Physitian's Library*.¹⁴ The innkeeper George Emlen, whose library of over fifty volumes was inventoried in 1711, had found useful Culpeper's *English Physitian* and Tryon's *The Way to Health, Long Life and Happiness*, a work that influenced Benjamin Franklin to set forth his own rules of temperate living.¹⁵ A copy of the Tryon book was also owned by the elder Isaac Norris, whose son inherited it.¹⁶

The first medical work written in the area was Francis Daniel Pastorius's "Artzney-Büchlein" of 1695, which survives in manuscript; it was never printed.¹⁷ In it, the author, who founded Germantown in 1683, included a bibliography representing either books he owned or ones available to him. He certainly brought some of them with him from Germany. They are a mixed lot, but most would be considered popular works. He, too, had Culpeper's ubiquitous vademecum, but was somewhat critical of it, noting that it "*ein überaus schlecht Register hat*."¹⁸ With this were listed Rivière's medical observations in Latin,

Boyle's *Medicinal Experiments*, Love's *Clavis Medicinae*, and Cooke's *Mellificium Chirurgiae*.¹⁹ Since the Dutch came early to Germantown, it is not surprising to find two anonymous Dutch texts and Nylandt's *Nederlandsche Herbarius*.²⁰ The German works were a curious mixture of science and pseudoscience: such a standard handbook as Wirsung's *Artzney Buch*, the works of Paracelsus in folio and quarto, Tollat von Vochenberg's primitive herbal, the alchemist-physician Thurneisser zum Thurn's alchemical treatise, Schmuck's explanation of the magico-magnetic secret of diseases, and Thiemen's omnium-gatherum, the *Haus-Feld-Arztney-Koch-Kunst- und Wunder-Buch*.²¹ These were do-it-yourself medical books, but we know that men of superior education or, indeed, self-education in the colonies frequently doctored their neighbors and domestics when professional physicians were not available. Pastorius himself, however, was the patient of Griffith Owen, to whom in 1714 he gave his copy of Grew's treatise on Epsom salts.²²

How we would have wanted to know what books comprised the collection of that fascinating old physician, botanist, clockmaker, and mystic, Christopher Witt, who died in 1765, the last survivor of the Rosicrucian community of the Wissahickon! The inventory of his estate merely lists "Mathematical Instruments, Library and prospect glasses" at £50, and "Drugs Medicines and other Utensils belonging to the Apothecarys and Doctors Way" at £60.²³ He could have bought Smith's *The Curiosities of Common Water*, printed by Samuel Keimer in 1723, the first medical book published in Philadelphia, or Drake's anatomical text, one that found a ready public, from that same bookseller, who advertised it in the *American Weekly Mercury* on October 8, 1724, as one of "A Choice Parcel of curious and valuable Books."²⁴ I am not of the statistical school of historiography, and so my choice of newspaper advertisements is random rather than structured, but a more systematic examination of works offered by booksellers might be highly productive.

Witt lived near James Logan in Germantown and would have had access to his library, qualitatively the finest in colonial America. Logan used a medical metaphor to describe his collecting: "Books are my disease."²⁵ He was a polymath whose intellectual arrogance was such that he considered himself an authority in all fields, and who had, indeed, a remarkable grasp of many disciplines. He owned fifty-four titles wholly devoted to medicine and uncounted others, botanical and zoological treatises, accounts of travel, chemistry texts, and encyclopedias, that are tangential. Logan's main incursion into medicine consisted of a theory of the connection of the heart and brain by way of the intercostal nerves. In the course of his work on the subject he used extensively Vieussens's *Neurographia Universalis*, the anatomical plates of Eustachius, Willis's anatomy of the brain, and Winslow's *Anatomical*

Exposition of the Structure of the Human Body.²⁶ He sent his findings to the eminent Dr. Richard Mead in London and was indignant that Mead did not promptly send his comments. "Perhaps he may despise it," he complained, "as coming from [me] who am not of the Profession, notwithstanding which it may probably appear I have made as good use of the best books extant on the Subject as many others who have ye honour of writing M.D."²⁷

In addition to those works he used in setting forth his misguided neurological thesis, Logan owned a rich scattering of other works. Because he was a classicist, he had a Greco-Latin edition of the works of Hippocrates and the *De Medicina* of Celsus.²⁸ Because he had a high regard for medieval Arab scientists, he got from London in 1724 Avicenna's work in two folio volumes.²⁹ Logan acquired a Latin edition of Albertus Magnus's secrets of women, which lost out to the similar pseudo-Aristotelian work as the eighteenth-century equivalent of today's bestselling sex manual, but he also had Harvey's two important works, Descartes's *Tractatus de Homine*, Hooke, Malpighi, and Leeuwenhoek on their microscopical discoveries, Steno on the anatomy of the brain in French, Hales's *Statical Essays*, and Borelli's classic study of animal motion.³⁰ Of course, Logan bought books by the early eighteenth century's most esteemed authority, Hermann Boerhaave, the collected scientific works of Boyle, the handy anatomical compendium of Gibson, the pharmaceutical writings of Lemery, Pommet, and Salmon, and the highly regarded opinions of Sydenham.³¹ When other strictly medical works are added to Logan's host of botanical ones, an impression is gained of a satisfactory reference collection which most physicians in colonial Pennsylvania would have been proud to boast of.

When the infant Library Company was drawing up a list of books to be sent for to London, it consulted James Logan. The handful of medical books which arrived with the others in the first shipment of 1732 were among those commonly found for sale and in the libraries of colonial America. As Dr. Lester S. King wrote in his account of the medical world in that period, "In the entire eighteenth century the most influential physician was probably Hermann Boerhaave."³² And it was Boerhaave's *New Method of Chemistry* which the founders of the library first chose.³³ This was supplemented by Drake's anatomy, Quincy's medical dictionary, Allen's practice of medicine, and the abridgment of the *Transactions* of the Royal Society.³⁴

Within the next nine years they increased this store measurably, once again with works of solid contemporary reputation. Some were then or later in James Logan's collection, such as Boyle's works and Sydenham's, one of Parkinson's herbals, Pommet's *Compleat History of Druggs*, the continually popular aphorisms of Santorio, Shaw's practice

of medicine, and that invaluable compilation, Chambers's *Cyclopaedia*.³⁵ But there were others equally valuable for a readership of provincials, far from a major metropolitan center of medical knowledge. Turner's *Art of Surgery* joined Cheyne's soothing *Essay of Health and Long Life*, which shared popularity with the hundred-year-old Venetian Cornaro's *Sure and Certain Methods of Attaining a Long and Healthful Life*.³⁶ Three works with some literary overtones were the treatise on air and on aliments by Dean Swift's friend Dr. Arbuthnot and Garth's satirical poem, *The Dispensary*.³⁷ There was also one of those compendiums of useful knowledge written for the English country gentry removed from the professional ambiance of a city, and equally apt for an American in similar circumstances, *The Complete Family-Piece, and Country-Gentleman, and Farmer's Best Guide*, containing with much else, "A valuable Collection of above 1000 practical Family-Receipts, in Physick, Surgery, Cookery, &c."³⁸

The increase in the number of medical books in the Library Company by the time a supplementary catalogue was printed in 1746 was substantial. Boerhaave really came into his own with the addition of his *Method of Studying Physick, Academical Lectures, Aphorisms*, and Van Swieten's *Commentaries*.³⁹ The Library Company's emergence as the locus of scientific experimentation in Philadelphia and its acquisition of a microscope and other instruments made necessary the purchase of the reissue of Hooke's classic work on the microscope and Baker's handbook on how to use one.⁴⁰ This all came under the head of useful knowledge, that ever-present goal of Franklin and the American Philosophical Society, which he was trying to promote. Its reorganization and library were some decades in the future. Meanwhile the Library Company added several general works on science which, of course, included medicine, Rollins's *History of the Arts and Sciences of the Antients*, Martin and Chambers's abridgment of the *Memoirs of the Académie royale des sciences at Paris*, and Martin's *Philological Library of the Arts and Sciences*.⁴¹

The most massive addition was the two-volume set in folio of James's standard *Medicinal Dictionary*.⁴² Since there were a certain number of books not in the early collection that, one assumes, the members of the Library Company had heard of and asked for, these were bought or given. They included Cheselden's anatomy, Mead on poisons, Freind's history of medicine, Hales's *Statistical Essays*, the other old, but still consulted, herbal of Parkinson, and that well-publicized work of Bishop Berkeley, *Siris*, in which he touted the virtues of tar water, together with Prior's confirmation of the Berkeley gospel.⁴³

During this period Franklin was printing books and selling imports from England. His first publication of medical interest was the 1732 witty

pseudonymous essay, *The Honour of the Gout; or, A Rational Discourse, Demonstrating That the Gout Is One of the Greatest Blessings Which Can Befal Mortal Man*, a forerunner of the printer's later very personal involvement with the disease.⁴⁴ Much more useful was *Every Man His Own Doctor*, reprinted in 1734 from a Williamsburg edition of the same year.⁴⁵ Franklin thought highly of this do-it-yourself vademecum, reprinted it in 1736 and possibly again in 1737, included it as part of Fisher's *American Instructor* in 1748 and 1753, and issued a German translation in 1749.⁴⁶ The printer-publisher was usually well attuned to what might sell. Only a year after it first appeared in London he reprinted in 1745 what looked like a good bet, Armstrong's poem, *The Art of Preserving Health*.⁴⁷ This time Franklin misjudged his market; a remainder of the edition was offered for sale in Williamsburg seven years later.

The most important and original medical work from Franklin's press was the local physician Thomas Cadwalader's *An Essay on the West-India Dry-Gripes* of 1745, in which he pointed out that the griping was due to lead poisoning, that metal being used in making rum.⁴⁸ On an equally professional level was Dr. Thomson's *Discourse on the Preparation of the Body for the Small-Pox*, given as a formal lecture before the trustees of the Academy of Philadelphia, which proposed that mercury and antimony be administered before inoculation.⁴⁹ This controversial procedure produced a small flurry of pamphlets that appeared the following year, Dr. Kearsley opposing it in *A Letter to a Friend* printed by Franklin, and Dr. Hamilton supporting it in *A Defence of Dr. Thomson's Discourse* printed by Bradford.⁵⁰ Not at all controversial was Short's *Medicina Britannica*, a materia medica which Franklin and Hall reprinted in 1751 with John Bartram's notes and his appendix of plants peculiar to America with their virtues, the earliest such list printed in this country.⁵¹ The establishment of two important Philadelphia medical institutions were recorded, by Franklin in 1754 with *Some Account of the Pennsylvania Hospital* and its *Continuation* in 1761, and by Dr. John Morgan in 1765 with *A Discourse upon the Institution of Medical Schools in America*.⁵²

Wesley's popular but unprofessional *Primitive Physick* was published in Philadelphia in 1764 and 1770, but there were comparatively few medical books printed there before the Revolution.⁵³ It was only in the 1770s that "modern" standard English texts were published: Tissot's *Advice to the People* and Cadogan's treatise on the gout in 1771, Buchan's *Domestic Medicine*, the most frequently reprinted of them all, in 1772, and Cullen's *Lectures on the Materia Medica* in 1775.⁵⁴ Even the most prolific native Philadelphian, the to-be-eminent

Dr. Benjamin Rush, published but four minor pieces between 1772 and 1774.⁵⁵ This only emphasized the need for the importation of books.

Some idea of these can be gained from a sampling of advertisements. Among the books that Franklin offered for sale in the *Pennsylvania Gazette* of March 21, 1734, was Blankaart's *Physical Dictionary*.⁵⁶ His selection was much larger when he printed up *A Catalogue of Choice and Valuable Books* that were to be sold "for Ready Money only" on April 11, 1744.⁵⁷ The folios included Culpeper's translation of the London *Dispensatory*, Browne's *Compleat Treatise of the Muscles*, and a two-volume Greco-Latin edition of the works of Aristotle.⁵⁸ Shaw's recension of the ubiquitous Boerhaave's chemical practice kept company among the quartos with Barrough's *Method of Physick*, and—an unusual offering—Dalechamps's well-illustrated *Chirurgie françoise*.⁵⁹ Naturally there were more octavos: Cooke's surgical epitome, Floyer's advocacy of cold baths and Fuller's of exercise, both of which Franklin himself mightily approved of, an abridgment of Etmüller's practice, the respected Sydenham's *Works*, Quincy's edition of *Medicina Statica*, "De la Vougion's compleat Body of Surgery, with Cuts of the Bandages, Sutures and the necessary Instruments," Mayerne's treatise on internal ailments, and Renou's alchemical pharmacopeia.⁶⁰ There were only two of the less expensive duodecimos: the dispensatory of the Collegium Medicum at The Hague and Harvey's *Family Physician*.⁶¹ As early as 1744 there were plenty of medical books available.

Booksellers and auctioneers included medical texts with other fare in their advertisements year after year. Cheyne's *Natural Method* and Quincy's *Lexicon* were among the books to be sold at Vidal's early in March 1746.⁶² An unusual advertisement appeared in the *Pennsylvania Gazette* of November 1, 1750, where Franklin offered the *Medulla Medicina Universae; or, A New Compendious Dispensatory* as "Lately published at Antigua" and printed there by the Philadelphian's partner, Thomas Smith.⁶³ In 1751 William Bradford listed for sale Cheyne on the gout, and that same year in David Hall's shipment, "just imported in the Wandsworth," were Boerhaave's *Academical Lectures* in six volumes, Quincy's *Lexicon* and pharmacopeia, Allen's *Synopsis Medicinae*, and Culpeper's long-lived *English Physician*.⁶⁴ This selection apparently did not appeal to the members of the Union Library Company, who in 1754 owned but three medical works: Tryon's old favorite, *The Way to Health*, Sydenham's collected works, and Cheselden's anatomy.⁶⁵ In 1756 Bradford's new imports included the pharmacopeias of the Royal College of Physicians of Edinburgh and of Quincy.⁶⁶ The following year his competitor Hall advertised Quincy's ubiquitous *Dispensatory* and Shaw's edition of Boerhaave's chemical classic.⁶⁷

A larger selection was offered by Hall in February 1764, including many of the most popular ones: Boerhaave's lectures, Sydenham's works, and Quincy's pharmaceutical vademecum.⁶⁸ However, he also had for sale *The Ladies Dispensatory* and some of the more modern ones, those of Lewis, Alleyne, and Brookes, as well as the obstetrical guides of Chamberlen, Smellie, Pugh, Deventer, Dawkes, and Culpeper.⁶⁹ John Sparhawk, "Apothecary and Chymist," and later book publisher, in the summer of that year informed the readers of the *Pennsylvania Gazette* that at his shop could be had the Quincy, Lewis, and Smellie listed above, and also the anatomies of Drake, Cheselden, and Keill, Huxham on fevers, Mead's collected works in quarto, Brookes's and Shaw's *Practice*, and Cheyne's *Natural Method and Essay of Health*.⁷⁰ Also in the same issue of the newspaper Hall offered, in addition to many of the works he earlier and Sparhawk simultaneously had on hand, Winslow's and Monro's anatomies, Astruc, Tissot, Glass, and Cheyne on fevers, the dispensaries of James and Pemberton, the practice of Heister and Shebbeare, and Cockburn on sea diseases, Lind on scurvy, Warren on diseases of the West Indies, and Douglas on the hydrocele.⁷¹ Many other medical books were listed for a total of seventy-six titles.

A summary of contemporary popularity is contained in William Hall's extensive catalogue of books for sale at the end of the year 1774 which listed seventy-three medical titles.⁷² Among them were—no surprise—Boerhaave's *Aphorisms*, Van Swieten's *Commentaries* in fourteen volumes, Smellie's, Pugh's, Culpeper's, and Mauriceau's obstetrical manuals, Buchan's *Domestic Medicine*, which became a runaway bestseller, the pharmacopeias of Quincy, Alleyne, James, Pemberton, Shaw, and Brookes, Cadogan on the gout, and Theobald's *Every Man His Own Physician*.⁷³ Two major contributions to medical science also appeared in the closely printed catalogue: Morgagni's pioneer pathological anatomy and Pringle's pioneer monograph on military medicine.⁷⁴ It should be noted that almost without exception the medical works imported commercially in colonial Philadelphia were in English.

Such was not the case with respect to several exceptionally large collections of medical books that emerged in the city after midcentury. Isaac Norris, merchant, James Logan's son-in-law, long-time Speaker of the Pennsylvania Assembly and a linguistically adept book collector, in 1751 and 1752 bought quantities of secondhand books sent to Philadelphia for sale by the London bookseller, Thomas Osborn.⁷⁵ They were chiefly old, even out-of-date, works in Latin which had found no market in more sophisticated London. Today they are rare-book treasures. Among them was Primrose's *De Vulgi in Medicina Erroribus*, his attack on Harvey's description of the circulation of the blood.⁷⁶ More positive contributions were Briggs's pioneering *Nova Visionis Theoria* and his *Ophthal-*

mographia, Morton's study of tuberculosis, the Jesuit philomath Kircher's microscopical observations, the great Danish physician Steno's anatomical observations of the mouth, eyes, and nose and the classic of the iatrochemical school, Le Boë's *Praxeos Medicae Idea Nova*.⁷⁷

There were editions of the much esteemed Hippocrates in Greek and French, and four printings of Rivière's *Praxis Medica*.⁷⁸ Yet the works of Englishmen were understandably well represented: Harris's pediatric manual, the authority on melancholia, Bright's *Hygieina*, the vegetable physiologist Grew's *Tractatus de Salis Cathartici Amari*, and Glisson's hepatic anatomy.⁷⁹ The great Sydenham's *Opera* was supplemented by four of his lesser monographs, and—inevitably—the shining star of Leyden, Boerhaave's *Institutiones* and *Aphorismi* found their place.⁸⁰ These books and many others were given by Norris's son-in-law, John Dickinson, to the college named after him in 1784. It is hard to imagine works then of less use to a newly founded institution.

It was Isaac Norris who wrote out the list of books which had formed the library of Dr. Lloyd Zachary after his death in 1756.⁸¹ On it were 104 medical works, a collection that any doctor in the colonies would have been pleased to own. It is almost as if all the titles theretofore available in Philadelphia were gathered in one man's collection. Of course, there were works by Sydenham and Boerhaave—they were the "two principal guides in theory and practice" of Dr. John Redman, Benjamin Rush's preceptor—the dispensaries of Quincy, Alleyne, Bate, and Radcliffe, the London pharmacopeia and those of Bate and Fuller, the anatomies of Gibson, Cheselden, Drake, Heister, and Bartholin, Harris on the diseases of infants, Lower on the heart, Maynewaring on scurvy, Willis on fermentation and convulsive diseases, Morton on the wasting away of tissues, or consumption, Needham on the foetus, and much else.⁸²

Zachary had such ancient texts as the aphorisms of Hippocrates—in English—and the medieval *Schola Salernitana*, but he also owned manuals of medical practice by the moderns Baglivi, Ettmüller, Shaw, and Pitcairne.⁸³ Certain of the solid eighteenth-century works of specialists appear in the inventory of his library: Turner's dermatological monograph, Astruc's study of venereal disease, Cheyne on nervous diseases, Freind's history of medicine, Strother on fevers, and Dionis on obstetrics.⁸⁴ In a separate list Norris indicated which of the books he would like to have.⁸⁵ We know he did not get many, if, indeed, any of them, for in January 1767 Zachary's heirs gave forty-two volumes and some pamphlets to the infant library of the Pennsylvania Hospital, constituting the first substantial accession of books to that institution.⁸⁶

The first book that had been received into the hospital's library was Lewis's *Experimental History*, brought to Philadelphia as the gift of Dr.

John Fothergill from London in 1762 by William Logan.⁸⁷ And only two weeks after the Zachary gift the sister of the late Dr. Benjamin Morris, a graduate of Leyden, gave the budding library some fifty-six volumes.⁸⁸ As might have been expected, the books of one educated on the Continent included a high percentage of works in Latin, most of them printed in Holland. There were ancient texts: a diglot edition of Hippocrates, Celsus's *De Medicina*, the second-century Aretaeus the Cappodocian's highly regarded descriptions of diseases, and the fifth-century Aurelianus's compendium of them.⁸⁹ Morris owned the collected works of the Portuguese-Jewish physician Abraham Zacutus, the Italians Bellini and Baglivi, the Halle professor Hoffmann, and the Scot Pitcairne.⁹⁰ Tulp's medical observations, containing his important pathological anatomy, came to the hospital's library with Waldschmidt's practice, Quesnay's monograph in French on gangrene, and the great Linnaeus's *Species Plantarum*.⁹¹ It was only to be expected that an alumnus of Leyden would have owned the local pharmacopeia and a trio of works by the pillar of the medical school, the redoubtable Boerhaave.⁹²

Yet, before the hospital library became a substantial resource in the city, the largest collection of medical works up to then brought to these shores arrived in Philadelphia. In 1758 William Logan, physician of Bristol, England, and brother of James, died, leaving his library to his namesake William, James's elder son. It arrived just as the books of William's father were being removed from the Logan country estate at Stenton to the Loganian Library at Sixth and Walnut streets in town.⁹³ The shipment must have pretty well filled the empty shelves. There were about 1,300 volumes, over half strictly medical works, as well as uncounted peripheral books of natural history and chemistry.⁹⁴

It is amazing that such a collection has not attracted the attention of American medical historians. The only reference to it that I know of should have stimulated some interest. In his 1953 biography of Dr. George Logan, the younger William's son, Frederick B. Tolles spoke of the hoard at Stenton:

Here were the medical classics—Galen, Avicenna, Paré, Vesalius, Harvey, Boerhaave. Here were the important recent treatises—the anatomical works of Morgagni and Alexander Monro *primus*, Lietaud's *Physiology*, the discourses of Mead and Pringle and Van Swieten. Here were curious volumes like Arnaud de Villeneuve on rejuvenation and Albertus Magnus' treatise on cosmetics, *The Secrets of Women*.⁹⁵

There were some inaccuracies in Tolles's enthusiastic statement, but substantially he was correct. The Avicenna, most of the Harveys, and the tract of Albertus Magnus had been old James Logan's. Nonetheless, the Vesalius was a copy of the handsome second edition, illustrated with the same woodcuts as the precious first.

The number of works now gilded as classics by inclusion in the great bibliography of Garrison and Morton which Dr. William Logan owned is impressive. There was a 1509 edition of the Arabic physician Rhazes's great encyclopedia of medicine, the first edition of Rueff's well-illustrated obstetrical manual printed at Zurich in 1555, the fourteenth-century Guy de Chauliac's book on surgery in a 1537 printing, and Tagliacozzi's pioneer text on plastic surgery.⁹⁶ The English doctors of the seventeenth century were well represented: numerous treatises by Charleton, Lower on the heart, Havers on bones, Glisson on rickets, the 1661 edition of Harvey's *De Motu Cordis*, Highmore on hysterics and hypochondria, a considerable number of the publications of Willis, who was noted for his clinical observations and was second only to Sydenham in contemporary reputation, Hodges's account of the Great Plague of 1665, and Mayow's *Tractatus Quinque*, "one of the best English medical classics."⁹⁷ Yet, the writings of Continental doctors were not overlooked. Logan owned the collected works of the pathologist Fernel, a number of monographs by the younger Caspar Bartholin, the second edition of Mauriceau's *Traité des maladies des femmes grosses*, which was for decades the standard gynecological text, the Dane Steno's work on muscular mechanics, the anatomical works of the Leyden professor Ruysch, and the findings of the kidney specialist Bellini.⁹⁸

The above paragraph hardly does justice to the riches which crossed the Atlantic to William Logan of Philadelphia, who for himself cared about them not at all, but two of whose sons, another William and George, studied medicine.⁹⁹ I would be remiss were I not to note that fourteen of the Bristol physician's library were discovered to be copies once owned by Henry Vaughan the Silurist, well known as a metaphysical poet, little known as a doctor.¹⁰⁰ By will William Logan left the library of his uncle to the Loganian Library with those works duplicating the holdings of his father going to the Library Company. He died in 1776.¹⁰¹ Is it any wonder that the practitioners of the late eighteenth century made tracks to the Loganian Library when it was satisfactorily housed in a wing of Library Hall?

During the colonial period most Americans relied on their almanacs for medical information, almost all of it, to be sure, of a folk or popular nature. In spite of the exhaustive record by Francesco Guerra of the snippets of guidance and do-it-yourself prescriptions contained in those widely circulated publications, I know of no analysis of their content or importance by a medical historian.¹⁰² I can here but call attention to their existence.

It is worthwhile—shotgun fashion—to mention some medical books owned by a wide variety of Philadelphians. Dr. John Redman gave copies of Sydenham and Boerhaave to the College of Physicians, and

Albinus's edition of the fine anatomical plates of Eustachius to the Pennsylvania Hospital.¹⁰³ The Philadelphia cabinetmaker Thomas Affleck apparently brought over with him from England Boyle's *Medicinal Experiments*, which his father had owned.¹⁰⁴ Ralph Assheton, a student of Redman, who boasted an armorial bookplate, would have had more books than the handful we know of, but these included—no surprise—Boerhaave's *Academical Lectures* and *Medical Correspondence*, and Groenvelt's *Rudiments of Physick*.¹⁰⁵ Dr. Charles Benzel, a midcentury resident of Germantown, put his bookplate in Blankaart's *Theatrum Chemicum* and Wecker's extracts from the "Secrets" of Alexis of Piedmont.¹⁰⁶ Robert Jenney, rector of Christ Church, whose books were sold at auction in 1766, included in his extensive library a copy of Charleton's *Oeconomia Animalis*.¹⁰⁷ Thomas Preston, a prominent and successful apothecary who had an armorial bookplate, left "a very valuable library of upwards of six hundred Chymical, Medical and Metallurgical Authors, and a variety of pamphlets," which were advertised for sale early in 1776.¹⁰⁸ Of these the Library Company has Baglivi's *Practice of Physick*, Coetlogon's general encyclopedia, the abridged Etmüller, Lemery's and Le Fèvre's chemistries, Helmont's *Works*, Hooke's *Philosophical Experiments*, and Gardiner's *Discourse concerning the Circulation of the Blood*.¹⁰⁹ The founder of the medical school at the College of Philadelphia, Dr. John Morgan, must have had a respectable collection. In the Library Company is his copy of Boerhaave's chemistry, but in the College of Physicians is Morgagni's classic *De Sedibus et Causis Morborum*, the work that established pathology as a branch of modern medicine, presented to the young doctor when he visited the octogenarian author in 1764.¹¹⁰ The apothecary Christopher Marshall understandably was possessed of a working collection. Although the complete contents of his library is not recorded, there have survived his copies of Bate's pharmacopeia, Blankaart's dictionary, and several alchemical works.¹¹¹

From inventories we know further that Benjamin Shoemaker, merchant, left in his 1767 estate one of Cheyne's works, Quincy's medical dictionary, Culpeper's dispensatory, and Cornaro's and Tryon's treatises on health.¹¹² Another merchant, Robert Strettell, who died in 1761, and the Presbyterian minister Gilbert Tennent both had copies of Culpeper's *English Physician*, and in addition the former also owned Salmon's dispensatory.¹¹³ The bits and pieces could go on, for in other local libraries are recognized and unrecognized medical books once on the shelves of colonial Philadelphians.

I end with a cliff-hanger. No mention has been made of the medical collections of Benjamin Franklin and Benjamin Rush. Both of these men owned medical books in colonial times and both increased their holdings

in later years, Franklin after he got to France and Rush as fame came his way. It so happens that there survive manuscript lists, both of 1790, of their works on medicine. In the case of Franklin it was a list compiled after his death by William Temple Franklin.¹¹⁴ Rush that year made a short-title catalogue of his whole library.¹¹⁵ These deserve fuller treatment than time or space here allows.

Notes

1. Edwin Wolf 2nd, *The Library of James Logan of Philadelphia, 1674-1751* (Philadelphia: Library Company of Philadelphia, 1974), p. lii.

2. Loganian Library, "Note-Book," June 23, 1794, Library Company of Philadelphia (LCP) Archives. The book contains promissory notes recording books borrowed. When the books were returned, the borrowers' signatures were cut off. An illustration of the "Note-Book" is in Wolf, *Library of James Logan*, facing p. xlviii. Adrian van den Spiegel, *Opera* (Amsterdam, 1645); Daniel Le Clerc, *Histoire de la medecine* (Amsterdam, 1723). Unless otherwise noted, all books cited from the Loganian Library and Library Company are still at LCP.

3. Robert B. Austin, *Early American Medical Imprints* (Washington: Government Printing Office, 1961), nos. 127 and 128. Austin numbers below refer to this bibliography.

4. "Note-Book," Feb. 2, 1796, Nov. 26-Dec. 3, 1796, Jan. 10-Mar. 16, 1797. Theophile Bonet, *Sepulchretum sive Anatomia Practica* (Lyons, 1700); Giovanni Battista Morgagni, *Adversaria Anatomica* (Leyden, 1723); Ambroise Paré, *Les Oeuvres* (Paris, 1614); Lazare Rivière, *Opera Medica Universa* (Frankfurt, 1669); Willem Piso, *De Indiae Utriusque Re Naturali et Medica* (Amsterdam, 1658); Francis Glisson, *Tractatus de Ventriculo et Intestinis* (London, 1677); Joseph Lieutaud, *Elementa Physiologiae* (Amsterdam, 1749).

5. Adam Kuhn (1741-1817), protege of Shippen, pupil of Linnaeus at Uppsala in 1762; M.D. (Edinburgh) 1767; professor of botany and materia medica (College of Philadelphia) 1768; professor of practice of physic (University of Pennsylvania) 1792. Caspar Wistar (1761-1818), pupil of John Redman; M.B. (University of Pennsylvania) 1782; M.D. (Edinburgh) 1786; professor of chemistry and physiology (College of Philadelphia) 1789; adjunct professor of practice of physic (University of Pennsylvania) 1792. Howard A. Kelly and Walter L. Burrage, *Dictionary of American Medical Biography* (New York: Appleton, 1928), pp. 715-16, 1318-19.

6. "Note-Book," Dec. 27, 1796. Johann Jacob Wepfer, *Observationes Anatomicae, ex Cadaveribus Eorum, Quos Sustulit Apoplexia* (Schaffhausen, 1675).

7. Edward Cutbush (1772-1843), M.D. (University of Pennsylvania) 1794. Charles Caldwell (1772-1853), M.D. (University of Pennsylvania) 1796. James Woodhouse (1770-1809), M.D. (University of Pennsylvania) 1792; professor of chemistry (University of Pennsylvania) 1795. Thomas Chalkley James (1766-1835), M.B. (University of Pennsylvania) 1787; studied London 1790-92, Edinburgh 1792-93. Kelly and Burrage, *Dictionary*, pp. 193, 281-82, 646-47, 1330-31.

8. Andreas Cleyer, ed., *Specimen Medicinae Sinicae* (Frankfurt, 1682); Geronimo Fracastoro, *Operum Pars Prior (et Posterior)* (Lyons, 1591); Leonardo Botallo, *Opera Omnia Medica et Chirurgica* (Leyden, 1660).

9. William H. Williams, *America's First Hospital: The Pennsylvania Hospital, 1751-1841* (Wayne, Pa.: Haverford House, 1976), p. 107.

10. *Ibid.*

11. Wills 54/1688 and 25/1709, Registrar of Wills, Philadelphia.

12. Edwin Wolf 2nd, "A Parcel of Books for the Province in 1700," *Pennsylvania Magazine of History and Biography*, 89 (1965): 438. Nicholas Culpeper, *The English Physician Enlarged* (London, 1695) and *Pharmacopoeia: or, The London Dispensatory* (London, 1695); and Thomas Gibson, *The Anatomy of Human Bodies Epitomized* (London, 1697). Two copies of each title were sent.

13. Edwin Wolf 2nd, "The Library of a Philadelphia Judge," *Pennsylvania Magazine of History and Biography*, 83 (1959): 190; Nicholas de Blegny, *New and Curious Observations* (London, 1676).

14. Will 83/1708, Registrar of Wills, Philadelphia. Lazare Rivière, *The Rational Physician's Library*, ed. Abdiah Cole and Nicholas Culpeper (London, 1661). A copy of this work was listed in Francis Daniel Pastorius's manuscript "Alvearialia," among the "Authors, whereout I after the manner of Bees have gathered the little Honey & Wax." Marion Dexter Learned, *The Life of Francis Daniel Pastorius* (Philadelphia: W. J. Campbell, 1908), pp. 254-55.

15. Thomas Tryon, *The Way to Health* (London, 1683, and later editions); Benjamin Franklin, *The Autobiography*, ed. Leonard W. Labaree (New Haven: Yale University Press, 1964), p. 63.

16. Norris's copy (London, 1683), formerly owned by Margaret Preston in 1708, is in LCP. Margaret Preston in 1709 married Richard Moore, spoken of as a physician, whose step-mother was Norris's wife's half-sister; Charles P. Keith, *The Provincial Councillors of Pennsylvania* (Philadelphia, 1883), pp. (16)-(17), 74.

17. Learned, *Life*, pp. 238-40.

18. Most of the entries give the place and date of printing, e.g. Culpeper, *The English Physician Enlarged* (London, 1698). The book also appears in Pastorius's catalogue of printed books as no. 4 in the octavos; Learned, *Life*, p. 279.

19. Lazare Rivière, *Observationes Medicae* (London, 1646); Robert Boyle, *Medicinal Experiments* (London, 1696 and 1698), vols. 1 and 3; Jeremiah Love, *Clavis Medicinae, or Practice of Physick Reformed* (London, 1674); James Cooke, *Mellificium Chirurgiae. Or, The Marrow of Many Good Authors* (London, 1648). The Boyle is listed in Pastorius's "Alvearialia," and the Rivière and Love as nos. 13 and 61 respectively in the octavos in his catalogue of printed books. Learned, *Life*, pp. 257, 280-81.

20. "Het Kleyn Voetwyfs Boeck, gedrukt. t'Amsterdam in 8^o"; *Vorstelijck Gheschenck. dat is, Een Medecyn Boeck* (Amsterdam? 1662); Petrus Nylandt, *Der Nederlandsche Herbarius of Kruidt-Boeck* (Amsterdam, 1673).

21. Christoph Wirsung, *Artzney Buch* (Heidelberg, 1568); Paracelsus, *Opera. Bücher und Schrifften* (Strasbourg, 1603) and *Operum Medico-Chimicorum* (Frankfurt, 1603-05); Johann Tollat von Vochenberg, *Ain Meisterlichs Buchlein der Artzney* (Memmingen, 1497, but many later editions); Leonhardt Thurneisser zum Thurn, *Archidoxia* (Berlin, 1575); Martin Schmuck, *De Occulta Magico-Magnetica Morborum* (Nuremberg, 1652) and *Secretorum Naturalium Chymicorum & Medicorum, Thesauriolus, oder Schatz-kästlein* (Nuremberg, 1652); Johann Christoph Thiemen, *Haus-Feld-Arztney-Koch-Kunst- und Wunder-Buch* (Nuremberg, 1700). The Frankfurt Paracelsus is listed in the "Alvearialia," where Culpeper's *Astrological Judgment of Diseases* (London, 1655) also appears. In addition to all other medical works, in Pastorius's catalogue of printed books "John Casimir's Catalogue of Medicines" is no. 10 in the folios and Tryon's *Miscellania* (London, 1696) no. 1 in the duodecimos. Learned, *Life*, pp. 256-57, 276, 282.

22. Nehemiah Grew, *Tractatus de Salis Cathartici Amari* (London, 1695); Learned, *Life*, p. 216.

23. Will, probated Feb. 4, 1765, Registrar of Wills, Philadelphia.

24. John Smith, *The Curiosities of Common Water* (Philadelphia, 1723), Austin 1769. Young Benjamin Franklin was working for Keimer when this was printed. James Drake, *Anthropologia Nova: or, A New System of Anatomy* (London, 1707, and later editions).

25. Wolf, *Library of James Logan*, p. xvii. The Wolf numbers below refer to this catalogue.

26. Raimond Vieussens, *Neurographia Universalis* (Lyons, 1685), Wolf 2062; Bartolomeo Eustachi, *Albini Explicatio Tabularum Anatomicarum* (Leyden, 1744), Wolf

715; Thomas Willis, *Cerebri Anatome* (London, 1664), Wolf 2152; James Benignus Winslow, *An Anatomical Exposition* (London, 1743), Wolf 2160.

27. James Logan to Richard Mead (in Latin), July 12, 1736, Letterbook A, p. 7, Historical Society of Pennsylvania; Wolf, *Library of James Logan*, p. xxxii.

28. Hippocrates, *Παντων των ιατρων κορυφαιου τα ευρισκομενα . . . Opera Omnia Quae Extant* (Geneva, 1657–62), Wolf 951; Aurelius Cornelius Celsus, *De Medicina Libri Octo* (Leyden, 1665), Wolf 446.

29. Avicenna, *Avicennae Arabum Medicorum Principis* (Venice, 1608), Wolf 129.

30. Albertus Magnus, *De Secretis Mulierum* (Strasbourg, 1607), Wolf 39; William Harvey, *Exercitationes Anatomicae, de Motu Cordis & Sanguinis Circulatione* (Rotterdam, 1654) and *Exercitationes de Generatione Animalium* (London, 1651), Wolf 905–6; René Descartes, *Tractatus de Homine* (Amsterdam, 1677), Wolf 594; Robert Hooke, *Micrographia Restaurata* (London, 1745), Wolf 981; Marcello Malpighi, *Opera Omnia* (London, 1686), Wolf 1295; Anton van Leeuwenhoek, *Arcana Natura Detecta* (Delft, 1695) and *Continuatio* (Delft, 1697), Wolf 1175–76; Nicolaus Steno, *Discours sur l'anatomie du cerveau* (Paris, 1669), Wolf 1902; Stephen Hales, *Statical Essays* (London, 1731–33), Wolf 890; Giovanni Borelli, *De Motu Animalium* (Leyden, 1710), Wolf 298.

31. Hermann Boerhaave, *Elementa Chemicæ* (Leipzig, 1732), *Institutiones Medicæ* (Leyden, 1708 and 1734), and *Materia Medica* (London, 1741), Wolf 279, 281–83; Robert Boyle, *The Philosophical Works* (London, 1738), Wolf 311; Thomas Gibson, *The Anatomy of Humane Bodies Epitomized* (London, 1684), Wolf 813; Nicolas Lemery, *Traité universel des drogues simples* (Paris, 1699), Wolf 1179; Pierre Pomet, *A Compleat History of Druggs* (London, 1737), Wolf 1606; William Salmon, *Pharmacopoeia Londinensis* (London, 1707), Wolf 1756; Thomas Sydenham, *The Whole Works* (London, 1740), Wolf 1947.

32. Lester S. King, *The Medical World of the Eighteenth Century* (Chicago: University of Chicago Press, 1958), p. 59.

33. Hermann Boerhaave, *A New Method of Chemistry* (London, 1727); Edwin Wolf 2nd, "The First Books and Printed Catalogues of the Library Company of Philadelphia," *Pennsylvania Magazine of History and Biography*, 78 (1954): 15.

34. James Drake, *Anthropologia Nova* (London, 1727–28); John Quincy, *Lexicon Physico-Medicum: or, A New Medicinal Dictionary* (London, 1730); John Allen, *Synopsis Medicinæ: or, A Brief and General Collection of the Whole Practice of Physick* (London, 1730); Royal Society of London, *The Philosophical Transactions and Collections to the End of the Year 1700*, ed. John Lowthorp, and idem., . . . *from the Year 1700 to the Year 1720*, ed. Henry Jones (London, 1731); Wolf, "First Books," pp. 14, 19–21. These arrived in the first shipment of books to the Library Company from London in 1732.

35. Robert Boyle, *The Philosophical Works* (London, 1738); Thomas Sydenham, *The Whole Works* (London, 1734); Pierre Pomet, *A Compleat History of Druggs* (London, 1712); Santorio Santorio, *Medicina Statica: Being the Aphorisms* (London, 1737); Peter Shaw, *A New Practice of Physic* (London, 1730); Ephraim Chambers, *Cyclopaedia: or, An Universal Dictionary of Arts and Sciences* (London, 1738). All these are listed in *A Catalogue of Books Belonging to the Library Company of Philadelphia* (Philadelphia, 1741). The Santorio, Shaw, and Chambers, not cited before, are in the Logan catalogue, Wolf 1765, 1828, 452.

36. Daniel Turner, *The Art of Surgery* (London, 1732); George Cheyne, *An Essay of Health and Long Life* (London, 1725); Luigi Cornaro, *Sure and Certain Methods of Attaining a Long and Healthy Life* (London, 1737).

37. John Arbuthnot, *An Essay concerning the Effects of Air on Human Bodies* (London, 1733) and *An Essay concerning the Nature of Aliments* (London, 1733); Samuel Garth, *The Dispensary: A Poem* (London, 1726).

38. *The Complete Family-Piece* (London, 1737).

39. Hermann Boerhaave, *A Method of Studying Physick* (London, 1719), *Academical Lectures on the Theory of Physic* (London, 1743), and *Aphorisms: Concerning the Knowledge and Cure of Diseases* (London, 1742); Gerard van Swieten, *The Commentaries upon the Aphorisms of Dr. Herman Boerhaave* (London, 1744); another edition of *A New Method of Chemistry* (London, 1741). All these are listed in "Books Added to the Library

Since the Year 1741," which is the third part of *The Charter of the Library Company of Philadelphia* (Philadelphia, 1746).

40. Robert Hooke, *Micrographia Restaurata* (London, 1745); Henry Baker, *The Microscope Made Easy* (London, 1742).

41. Charles Rollin, *The History of the Arts and Sciences of the Antients* (London, 1737–39); Académie royale des sciences, *The Philosophical History and Memoirs* (London, 1742); Benjamin Martin, *Bibliotheca Technologica: or, A Philological Library of Literary Arts and Sciences* (London, 1737).

42. Robert James, *A Medicinal Dictionary* (London, 1743–45).

43. William Cheselden, *The Anatomy of the Human Body* (London, 1741); Richard Mead, *A Mechanical Account of Poisons* (London, 1745); John Freind, *The History of Physick* (London, 1727); Stephen Hales, *Statical Essays* (London, 1738); John Parkinson, *Theatrum Botanicum, The Theater of Plantae. Or, An Universall and Compleate Herball* (London, 1640); George Berkeley, *Siris: A Chain of Philosophical Reflexions and Inquiries concerning the Virtues of Tar-Water* (London, 1744); Thomas Prior, *An Authentick Narrative of the Success of Tar-Water* (London, 1746). The Parkinson was given to the Library Company on Feb. 14, 1743, by Dr. Patrick Baird.

44. Philander Misiatruss, *The Honour of the Gout* (Philadelphia, 1732), C. William Miller, *Benjamin Franklin's Philadelphia Printing, 1728–1766*, *Memoirs of the American Philosophical Society*, vol. 102 (Philadelphia, 1974), no. 62. Miller numbers below refer to this bibliography.

45. *Every Man His Own Doctor: or, The Poor Planter's Physician* (Philadelphia, 1734), Miller 84.

46. Miller 120 and 131; George Fisher, *The American Instructor: or, Young Man's Best Companion . . . To Which Is Added, The Poor Planter's Physician* (Philadelphia, 1748 and 1753), Miller 439 and 568; *Ein jeder sein eigner Doctor* (Philadelphia, 1749), Miller 467.

47. John Armstrong, *The Art of Preserving Health: A Poem* (Philadelphia, 1745), Miller 367.

48. Miller 369.

49. Miller 518.

50. John Kearsley, *A Letter to a Friend: Containing Remarks on a Discourse Proposing a Preparation of the Body for the Small-Pox* (Philadelphia, 1751), Miller 532; Alexander Hamilton, *A Defence of Dr. Thomson's Discourse* (Philadelphia, 1751), Austin 859.

51. Thomas Short, *Medicina Britannica: or, A Treatise on Such Physical Plants, as Are Generally to Be Found in the Fields or Gardens of Great-Britain* (Philadelphia, 1751), Miller 546.

52. Miller 587 and 764; Austin 1335.

53. John Wesley, *Primitive Physick: or, An Easy and Natural Method of Curing Most Diseases* (Philadelphia, 1764 and 1770), Austin 2027 and 2029.

54. William Cadogan, *A Dissertation on the Gout* (Philadelphia, 1771), Austin 372; Samuel A. A. D. Tissot, *Advice to the People in General, with Regard to Their Health* (Philadelphia, 1771), Austin 1913–15; William Buchan, *Domestic Medicine: or, The Family Physician* (Philadelphia, 1772), Austin 308–9; William Cullen, *Lectures on the Materia Medica* (Philadelphia, 1775), Austin 577. For a correction of the date of the first American edition of Buchan, see Edwin Wolf 2nd, "Report of the Librarian," *The Annual Report of the Library Company of Philadelphia for the Year 1972* (Philadelphia, 1973), pp. 25–26.

55. Benjamin Rush, *Experiments and Observations on the Mineral Waters of Philadelphia*, Abington, and Bristol (Philadelphia, 1773), *An Oration, Delivered February 4, 1774* (Philadelphia, 1774), *Sermons to Gentlemen upon Temperance and Exercise* (Philadelphia, 1772), and *Syllabus of a Course of Lectures on Chemistry* (Philadelphia, 1770 and 1774), Austin 1642, 1678, 1680, 1684, 1685.

56. Stephen Blankaart, *A Physical Dictionary* (London, 1684, and later editions).

57. *A Catalogue of Choice and Valuable Books, Consisting of Near 600 Volumes, in Most Faculties and Sciences* (Philadelphia, 1744), Miller 346. A facsimile of the unique copy with notes by Carl Van Doren was published by the University of Pennsylvania in 1948.

58. Nicholas Culpeper, *A Physicall Directory: or, A Translation of the Dispensatory Made by the Colledge of Physicians of London* (London, 1650, and later editions), listed by Franklin as the "English Dispensatory"; John Browne, *A Compleat Treatise of the Muscles, As They Appear in the Humane Body* (London, 1681, and later editions); Aristoteles, *Opera Omnia Quae Extant* (possibly Paris, 1619 or 1629).

59. Hermann Boerhaave, *A New Method of Chemistry* (London, 1741); Philip Barrough, *The Method of Physick* (London, 1654), actually an octavo; Jacques Dalechamps, *Chirurgie françoise* (Paris, 1610).

60. Cooke, above, n. 19; John Floyer, *The Ancient ψυχρολουσία Revived: or, An Essay to Prove Cold Bathing Both Safe and Useful* (London, 1702, and later editions); Francis Fuller, *Medicina Gymnastica: or, A Treatise concerning the Power of Exercise* (London, 1705); Michael Ettmüller, *Etmullerus Abridg'd: or, A Compleat System of the Theory and Practice of Physic* (London, 1699, and later editions); Thomas Sydenham, *The Whole Works* (London, 1696, and later editions); Santorio Santorio, *Medicina Statica* (London, 1712, and later editions); De La Vauguion, *A Compleat Body of Chirurgical Operations* (London, 1699); Théodore Turquet de Mayerne, *Praxeos Mayernianae in Morbis Internis* (London, 1690-96, and later editions); Jean de Renou, *Dispensatorium Galeno-Chymicum* (Paris, 1608, and later editions), but not octavos.

61. The Hague, Collegium Medicum, *Pharmacopoeia Hagana* (The Hague, 1659); Gideon Harvey, *The Family Physician* (London, 1676).

62. George Cheyne, *The Natural Method of Cureing the Diseases of the Body and the Disorders of the Mind* (London, 1742, and later editions); John Quincy, *Lexicon Physico-Medicum* (London, 1717, and later editions); *Pennsylvania Gazette*, Mar. 4, 1746.

63. John Theobald, ed., *Medulla Medicinae Universae* (Antigua, 1750), Wilberforce Eames, "The Antigua Press and Benjamin Mecom, 1748-1765," *Proceedings of the American Antiquarian Society*, n.s. 39 (1929): 24.

64. George Cheyne, *Observations concerning the Nature and Due Method of Treating the Gout* (London, 1720, and later editions); *Pennsylvania Journal*, Jan. 22, 1751; Hermann Boerhaave, *Academical Lectures* (London, 1743-46, and later editions); Quincy, above n. 62, and *Pharmacopoeia Officinalis & Extemporanea: or, A Compleat English Dispensatory* (London, 1718, and later editions); John Allen, *Synopsis Medicinae* (London, 1730, and later editions); Nicholas Culpeper, *The English Physician* (London, 1652, and later editions; by 1751 over 20 had been published); *Pennsylvania Gazette*, May 30, 1751.

65. Thomas Tryon, *The Way to Health* (London, 1691); Thomas Sydenham, *The Whole Works* (London, 1701); William Cheselden, *The Anatomy of the Humane Body* (London, 1713, and later editions); *A Catalogue of Books Belonging to the Union-Library-Company of Philadelphia* (Philadelphia, 1754), pp. 33, 39.

66. Royal College of Physicians of Edinburgh, *Pharmacopoeia* (Edinburgh, 1722, and later editions); Quincy, *Pharmacopoeia*, above, n. 64; *Pennsylvania Journal*, Jan. 8, 1756.

67. Quincy, *Pharmacopoeia*, above, n. 64; Hermann Boerhaave, *A New Method of Chemistry* (London, 1727, and later editions); *Pennsylvania Gazette*, Dec. 29, 1757.

68. Boerhaave, above, n. 64; Sydenham, above, n. 60; Quincy, above, n. 64; *Pennsylvania Gazette*, Feb. 9, 1764.

69. *The Ladies Dispensatory: or, Every Woman Her Own Physician* (London, 1739); William Lewis, *The New Dispensatory* (London, 1753); James Alleyne, *A New English Dispensatory* (London, 1733); Richard Brookes, *The General Dispensatory* (London, 1753); François Mauriceau, *The Accomplisht Midwife* (London, 1673, and later editions), translated by Peter Chamberlen of forceps fame; William Smellie, *A Treatise on the Theory and Practice of Midwifery* (London, 1752, and later editions); Benjamin Pugh, *A Treatise of Midwifery* (London, 1748); Hendrik van Deventer, *The Art of Midwifery Improv'd* (London, 1716, and later editions); Thomas Dawkes, *The Midwife Rightly Instructed* (London, 1736); Nicholas Culpeper, *A Directory for Midwives* (London, 1651, and later editions); *Pennsylvania Gazette*, Feb. 9, 1764.

70. Drake, above, n. 24; Cheselden, above n. 65; James Keill, *The Anatomy of the Humane Body* (London, 1698, and later editions); John Huxham, *An Essay on Fevers* (London, 1750, and later editions); Richard Mead, *The Medical Works* (London, 1762); Richard Brookes, *The General Practice of Physic* (London, 1751, and later editions); Peter Shaw, *A*

New Practice of Physic (London, 1726, and later editions); Cheyne, above n. 62, and *An Essay on Health* (London, 1724, and later editions); *Pennsylvania Gazette*, Aug. 30, 1764.

71. James Benignus Winslow, *An Anatomical Exposition of the Structure of the Human Body* (London, 1733, and later editions); Alexander Monro, *The Anatomy of the Human Bones* (London, 1726, and later editions); Jean Astruc, *Academical Lectures on Fevers* (London, 1747); Samuel A. A. D. Tissot, *An Essay on Bilious Fevers* (London, 1760); Thomas Glass, *Twelve Commentaries on Fevers* (London, 1752); George Cheyne, *A New Theory of Continual Fevers* (London, 1701, and later editions); Robert James, *Pharmacopoeia Universalis* (London, 1747, and later editions); Royal College of Physicians, *The Dispensatory*, trans. Henry Pemberton (London, 1746, and later editions); Lorenz Heister, *A General System of Surgery* (London, 1743, and later editions); John Shebbeare, *The Practice of Physic* (London, 1755); William Cockburn, *An Account of the Nature, Causes, Symptoms and Cure of the Distempers That Are Incident to Sea-faring People* (London, 1696, and later editions, as *Sea Diseases*); James Lind, *A Treatise on the Scurvy* (Edinburgh, 1753, and later editions); Henry Warren, *A Treatise concerning the Malignant Fever in Barbados* (London, 1740); John Douglas, *A Treatise on the Hydrocele* (London, 1755); *Pennsylvania Gazette*, Aug. 30, 1764.

72. William Hall, at the New Printing-Office, in Market-street, Philadelphia, *Has to Dispose of, Wholesale and Retail, the Following Books, &c.* (Philadelphia, 1774).

73. These all have been cited above.

74. Giovanni Battista Morgagni, *The Seats and Causes of Diseases* (London, 1769); John Pringle, *Observations on the Diseases of the Army* (London, 1752, and later editions); Leslie T. Morton, *Garrison and Morton's Medical Bibliography* (New York: Argosy Bookstore, 1954), nos. 2276 (Venice, 1761) and 2150 (hereafter cited as Garrison and Morton).

75. Edwin Wolf 2nd, Introduction to Marie Elena Korey, *The Books of Isaac Norris, 1701-1766, at Dickinson College* (Carlisle, Pa.: The College, 1976), pp. 4-6.

76. James Primerose, *De Vulgi in Medicina Erroribus* (London, 1638, and Rotterdam, 1658), Korey 1448-49.

77. William Briggs, *Nova Visionis Theoria* (London, 1685), and *Ophthalmologia* (London, 1687), Korey 295-96; Richard Morton, *Phthisiologia: seu, Exercitationes de Phthisi* (London, 1689), Korey 1284; Athanasius Kircher, *Scrutinium Physico-Medicum Contagiosae Luis, Quae Dicitur Pestis* (Leipzig, 1659), Korey 976; Nicolaus Steno, *Observationes Anatomicae, Quibus Varia Oris, Oculorum, & Narium Vasa Describuntur* (Leyden, 1662), Korey 1695; Franz de Le Boë, *Praxeos Medicae Idea Nova* (Amsterdam, 1672, 1671, and 1674), Korey 1044-45.

78. Hippocrates, *Ἀφορισμοὶ νεώτεροι*. *Aphorismi Novi* (Lyons, 1684) and *Aphorismes* (Paris, 1685), Korey 865-66; Lazare Rivière, *Praxis Medica* (Gouda, 1649, and Lyons, 1653, 1657, and 1674), Korey 1507-10.

79. Walter Harris, *De Morbis Acutis Infantum* (London, 1689), Korey 820; Timothy Bright, *Hygieina, id est, De Sanitate Tuenda* (Mainz, 1647), Korey 297; Nehemiah Grew, *Tractatus de Salis Cathartici Amari* (London, 1695), Korey 789; Francis Glisson, *Anatomia Hepatis* (London, 1654, and Rotterdam, 1659), Korey 757-58.

80. Thomas Sydenham, *Opera Universa* (London, 1705), *Epistolae Responsoriae Duae* (London, 1685), *Observationes Medicae circa Morborum Acutorum Historiam et Curationem* (London, 1685), and *Schedula Monitoria de Novae Febris Ingressu* (London, 1686 and 1688), Korey 1715-19; Hermann Boerhaave, *Aphorismi de Cognoscendis et Curandis Morbis* (Leyden, 1722), and *Institutiones Medicae* (Leyden, 1713 and 1727), Korey 254-56.

81. Dr. Lloyd Zachary's Estate, Nov. 30, 1756, Logan Papers, XXII, 62, Historical Society of Pennsylvania.

82. The books that Zachary's heirs gave to the Pennsylvania Hospital are so designated in *A Catalogue of the Books Belonging to the Medical Library in the Pennsylvania Hospital* (Philadelphia, 1790), and PH below refers to that catalogue, where the titles are listed by size, i.e., folio, quarto, etc. Sydenham, above n. 60, and *Observationes Medicae* (London, 1676), PH 29.D; Boerhaave, above n. 67, *Praxis Medica Boerhaaveana, Being a Compleat Body of Prescriptions* (London, 1716), PH 62.D, and *Aphorismi de*

Cognoscendis et Curandis Morbis (Leyden, 1709, and later editions); Whitfield J. Bell, Jr., "John Redman, Medical Preceptor, 1722-1808," *Pennsylvania Magazine of History and Biography*, 81 (1957): 162; John Quincy, *The Complete English Dispensatory* (London, 1720), PH 193.0; James Alleyne, *A New English Dispensatory* (London, 1733), PH 59.0; John Radcliffe, *Pharmacopoeia Radcliffiana*; or, *Dr. Radcliffe's Prescriptions* (London, 1716); Royal College of Physicians, *Pharmacopoeia* (London, 1747), PH 44.D; George Bate, *Pharmacopoeia Bateana*; or, *Bate's Dispensatory* (London, 1706), PH 56.0, and *Pharmacopoeia Bateana in Libros Duos* (London, 1719), PH 35.D; Thomas Fuller, *Pharmacopoeia Domestica* (London, 1723), PH 45.D; Thomas Gibson, *The Anatomy of Humane Bodies Epitomized* (London, 1682, and later editions); Cheselden, above, n. 65; Drake, above n. 24; Lorenz Heister, *A Compendium of Anatomy* (London, 1721, and later editions); Thomas Bartholin, *Anatomia* (Leyden, 1651, and later editions); Harris, above n. 79; Richard Lower, *Tractatus de Corde* (London, 1669, and later editions); Everard Maynwaring, *Morbus Polyrrhizos et Polymorphaeus. A Treatise of Scurvy* (London, 1666), PH 56.D; Thomas Willis, *Diatribae Duae Medico-Philosophicae* (London, 1659, 1662, and 1677), PH 30.D and 59.D, and *Pathologiae Cerebri, et Nervosi Generis Specimen* (London, 1668 and 1678); Morton, above, n. 77; Walter Needham, *Disquisitio Anatomica de Formato Foetu* (London, 1667), PH 42.D.

83. Hippocrates, *Aphorisms*, probably ed. Sprengell (London, 1708, and later editions); Schola Salernitana (Rotterdam, 1649), PH 67.D; Giorgio Baglivi, *The Practice of Physick* (London, 1704, and later editions); Etmüller, above n. 60; Shaw, above n. 70; Archibald Pitcairne, *The Philosophical and Mathematical Elements of Physic* (London, 1718), PH 63.0.

84. Daniel Turner, *De Morbis Cutaneis. A Treatise of Diseases Incident to the Skin* (London, 1714, and later editions); Jean Astruc, *A Treatise of the Venereal Disease* (London, 1737, and later editions); George Cheyne, *The English Malady*; or, *A Treatise of Nervous Diseases of All Kinds* (London, 1733, and later editions); John Freind, *The History of Physick* (London, 1726), PH 186.0; Edward Strother, *Criticon Februm*; or, *A Critical Essay on Fevers* (London, 1725), PH 188.0; Pierre Dionis, *A General Treatise of Midwifery* (London, 1719).

85. Logan Papers, XXII, 18, Historical Society of Pennsylvania.

86. Williams, *America's First Hospital* (above, n. 9) p. 48.

87. *Ibid.*, p. 47; William Lewis, *An Experimental History of the Materia Medica* (London, 1761), PH 5.Q.

88. Williams, *America's First Hospital*, p. 48.

89. These books, too, are noted as the gift of Deborah Morris in the 1790 *Catalogue*. Hippocrates, *Opera Omnia. Graece et Latina Edita* (Leyden, 1665), PH 176.0; Aurelius Cornelius Celsus, *De Medicina* (Leyden, 1746), PH 201.0; Aretaeus of Cappadocia, *De Causis et Signis Acutorum et Diuturnorum Morborum* (Leyden, 1735), PH 5.F; Caelius Aurelianus, *De Morbis Acutis et Chronicis* (Amsterdam, 1722), PH 41.Q.

90. Abraham Zacutus, *Zacuti Lusitani, Medici et Philosophi Praestantissimi Tomi IX* (Amsterdam, 1642), PH 18.D; Lorenzo Bellini, *Opera Omnia* (Venice, 1732), PH 33.Q; Giorgio Baglivi, *Opera Omnia* (Leyden, 1745), PH 35.Q; Friedrich Hoffmann, *Opera Omnia* (Geneva, 1748-49), PH 6.F; Archibald Pitcairne, *Opuscula Medica* (Rotterdam, 1714), PH 38.Q.

91. Nicolaus Tulp, *Observationes Medicae* (Leyden, 1739), PH 25.D; Johann Jakob Waldschmidt, *Praxis Medicinæ* (Paris, 1691), PH 36.D; François Quesnay, *Traité de la gangrene* (Paris, 1749), PH 38.D; Carolus Linnaeus, *Species Plantarum* (Stockholm, 1753), PH 99.0.

92. *Pharmacopoeia Leidensis* (Leyden, 1751); Hermann Boerhaave, *Institutiones* (Leyden, 1720), PH 25.D, *Aphorismi* (Leyden, 1737), PH 22.D, and *Praelectiones* (Göttingen, 1740), PH 13.D.

93. Wolf, *Library of James Logan*, p. 1.

94. The majority of Dr. Logan's collection was given to the Loganian Library, which moved in with the Library Company in 1792, and the titles are intermixed with those of James Logan's books in the *Catalogue of the Books Belonging to the Loganian Library* (Philadelphia, 1795). Such as duplicated James Logan's books—some forty titles—went to

the Library Company, and were marked with an "L" in *A Catalogue of the Books Belonging to the Library Company of Philadelphia* (Philadelphia, 1789). Until comparatively recently the provenances of James and William were not definitively differentiated.

95. Frederick B. Tolles, *George Logan of Philadelphia* (New York: Oxford University Press, 1953), pp. 16-17. Galenus, *Γαληνου Απαντα* (Basel, 1538), *Opera Omnia* (Venice, 1625), *Epitome Galeni* (Basel, 1571), and *In Aphorismos Hippocratis Commentaria* (Leyden, 1633); Avicenna, above, n. 29; Paré, above, n. 4; Andreas Vesalius, *De Humani Corporis Fabrica* (Basel, 1555); Harvey, above n. 30, and *Exercitationes Anatomicae de Cordis et Sanguinis Motu* (London, 1661); Boerhaave, above, n. 31, and MS. lecture notes of three courses, 1708-11, *Aphorismi* (Leyden, 1709), *Elementa Chemiae* (Paris, 1733), *Index Plantarum, Quae in Horto Academico Lugduno Batavo Reperiuntur* (Leyden, 1710), *Historia Plantarum* (Rome, 1727), and *Praxis Medica* (Padua, 1728); Morgagni, above, n. 4; Alexander Monro, *The Anatomy of the Human Bones* (Edinburgh, 1732); Lieutaud, above, n. 4; Richard Mead, *De Imperio Solis ac Lunae in Corpora Humana* (London, 1746), *De Peste* (London, 1723), *A Mechanical Account of Poisons* (London, 1702 and 1745), *Medica Sacra* (Amsterdam, 1749), *Monita et Praecepta Medica* (London, 1751), and *Oratio Anniversaria Harveiana* (Leyden, 1725); John Pringle, *Observations on the Diseases of the Army* (London, 1753); Gerard van Swieten, *Commentaria in Hermanni Boerhaave Aphorismos* (Leyden, 1742-53); Arnauld de Villeneuve, *Opera* (Basel, 1585, and Lyons, 1509).

96. Rhazes, *Continens Rasis* (Venice, 1509), Garrison and Morton 40 (earlier edition); Jacob Rueff, *De Conceptu et Generatione Hominis* (Zurich, 1554), Garrison and Morton 463; Guy de Chauliac, *Chirurgia Magna* (Lyons, 1585), Garrison and Morton 5556 (earlier edition); Gaspare Tagliacozzi, *De Curtorum Chirurgia per Insitionem* (Venice, 1597), Garrison and Morton 5734.

97. Walter Charleton, *De Scorbuto* (London, 1672), *Inquisitio Physica de Causis Catameniorum* (London, 1685), and *Oeconomia Animalis* (London, 1669); Richard Lower, *Tractatus de Corde* (London, 1670); Clopton Havers, *Osteologia Nova* (London, 1691); Francis Glisson, *De Rachitide* (London, 1650); Harvey, above n. 95; Nathaniel Highmore, *Exercitationes Duae, Quarum Prior de Passione Hysterica; Altera de Affectione Hypochondriaca* (Oxford, 1660); Thomas Willis, *Affectionum Quae Dicuntur Hystericae* (London, 1670), *Cerebri Anatome* (London, 1664), *De Anima Brutorum* (London, 1672, and Oxford, 1672), *Diatribae Duae Medico-Philosophicae* (London, 1662), *Pathologiae Cerebri* (London, 1678), and *Pharmaceutice Rationalis* (Oxford, 1674); Nathaniel Hodges, *Λοιμολογια. Sive Pestis* (London, 1672); John Mayow, *Tractatus Quinque Medico-Physici* (Oxford, 1674), Garrison and Morton 578.

98. Jean Francois Fernel, *Universa Medicina* (Utrecht, 1656); Caspar Bartholin, *De Ovaris Mulierum et Generationis Historia* (Amsterdam, 1678), *De Tibiis Veterum* (Amsterdam, 1679), *Diaphragmatis Structura Nova* (Paris, 1676), and *Specimen Historiae Anatomicae Partium Corporis Humani* (Copenhagen, 1701); François Mauriceau, *Traité des maladies des femmes grosses* (Paris, 1675); Nicolaus Steno, *De Musculis et Glandulis Observationum Specimen* (Amsterdam, 1664); Fredrik Ruysch, *Opera Omnia* (Amsterdam, 1721-25); Lorenzo Bellini, *De Urinis et Pulsibus* (Leyden, 1717).

99. William Logan (1747-1772) received his medical degree at Edinburgh in 1770, and his brother George (1753-1821) graduated from there in 1779.

100. Edwin Wolf 2nd, "Some Books of Early English Provenance in the Library Company of Philadelphia," *The Book Collector*, 9 (1960): 281-84.

101. Wolf, *Library of James Logan*, p. li.

102. Francisco Guerra, *American Medical Bibliography, 1639-1783* (New York: Lathrop C. Harper, 1962), pp. 277-417.

103. Bell, "John Redman" (above, n. 82), p. 162; Bernard Siegfried Albinus, *Explicatio Tabularum Anatomicarum Bartholomaei Eustachii* (Leyden, 1744), PH 4.F.

104. Robert Boyle, *Medicinal Experiments* (London, 1694), with the bookplate of James Affleck, in LCP.

105. Hermann Boerhaave, *Academical Lectures* (London, 1751-57), and *Medical Correspondence* (London, 1745); Jan Groenveldt, *The Rudiments of Physick* (London, 1753), all in LCP.

106. Steven Blankaart, *Theatrum Chemicum, oder Eröffneter Schau-Platz* (Leipzig, 1694); Alexis of Piedmont, *Kunstbuch des wolerfarnen Herren Alexij Pedemontani* (Basel, 1577); Part II: *The Valuable Library of the Hon. Samuel W. Pennypacker . . . to be sold . . . April 25, 1906* (Philadelphia, 1906), lots 33 and 424.

107. *Pennsylvania Gazette*, Dec. 18, 1766; Walter Charleton, *Oeconomia Animalis* (London, 1669), in LCP.

108. *Pennsylvania Journal*, Feb. 28, 1776.

109. Giorgio Baglivi, *The Practice of Physick* (London, 1704); Dennis de Coetlogon, *An Universal History of Arts and Sciences* (London, 1745); Michael Ettmüller, *Etmullerus Abridg'd* (London, 1703); Nicolas Lemery, *A Course of Chymistry* (London, 1698); Nicolas Le Fèvre, *A Compleat Body of Chymistry* (London, 1670); Jean Baptiste van Helmont, *Works* (London, 1664); Robert Hooke, *Philosophical Experiments and Observations* (London, 1726); John Gardiner, *A Discourse concerning the Circulation of the Blood* (London, 1702). All these were bought by the Library Company at the Preston auction sale held on March 4.

110. Hermann Boerhaave, *New Method of Chemistry* (London, 1741); Giovanni Battista Morgagni, *De Sedibus, et Causis Morborum per Anatomen Indagatis* (Venice, 1761); Whitfield J. Bell, Jr., *John Morgan, Continental Doctor* (Philadelphia: University of Pennsylvania Press, 1965), pp. 89–90.

111. George Bate, *Pharmacopoeia Bateana* (London, 1706); Steven Blankaart, *The Physical Dictionary* (London, 1715); Jean Baptiste van Helmont, *A Ternary of Paradoxes. Magnetic Cure of Wounds* (London, 1650); William Cooper, *The Philosophical Epitaph of W. C. Esquire* (London, 1673), all in LCP.

112. Will, probated July 6, 1767, Registrar of Wills, Philadelphia; George Cheyne, *An Essay on Regimen* (London, 1740, and later editions); Quincy, above, n. 62; Culpeper, above, n. 58; Luigi Cornaro, *Sure and Certain Methods of Attaining a Long and Healthful Life* (2d ed., London, 1704, and later editions); Thomas Tryon, *The Way to Health* (London, 1683, and later editions).

113. Inventory, Sept. 8, 1761; Inventory, Oct. 24, 1764; Culpeper, above, n. 64; William Salmon, *Pharmacopoeia Londinensis* (London, 1678, and later editions).

114. William Temple Franklin, "Medecine & Surgery" [books in the library of the late Benjamin Franklin], 1790, MS. in possession of George Vaux, Bryn Mawr, Pa. It lists 110 titles.

115. Benjamin Rush, "Catalogue of Books belonging to Benj. Rush 1790," MS. in LCP. It lists 328 titles, including chemistry and "Natural philosophy."

The Physician as Bibliographer and Bibliophile

K. Garth Huston

The line between bibliophily and bibliomania may be as narrow as that between social drinking and alcoholism: the compulsion to indulgence at times can be similar and overwhelming. But a true bibliophile denies this relationship. The excitement engendered by the bookseller's catalogue in the morning mail, the hurried search for favorite book or author, the quick cable or telephone call, the joy of success or the frustration of failure, the tremor, tachycardia, sweaty palms, all are dismissed as natural and proper manifestations of bibliophily, not bibliomania.

The virus of bibliophily is endemic among physicians. All start with a basic number of textbooks in medical school and acquire further books and journals for study and reference in postgraduate work and medical practice. This by itself is *not* bibliophily. Varied and still only partially identified stimuli change this casual interest into the all-consuming urge of the dedicated bookcollector. As in the New Testament parable of the sower and his seed, only occasionally does the seed fall on fallow ground, but instead falls usually among thorns, on stony ground, or by the wayside.

Here I want to discuss one of the less common manifestations of bibliophily, that of bibliography, limiting the discussion to several English and American physicians of the seventeenth to the twentieth centuries who are of personal interest to me.

Walter Charleton, well known in English medicine in the middle and late seventeenth century, is almost forgotten today. His father, also named Walter, was a country vicar with much ability but small financial resources. He taught his son by himself until he was ready for the university at age sixteen, and then sent him to Oxford. Walter made good progress there under the tutelage of Dr. John Wilkins. King Charles I was in Oxford during the Civil War, and he was so impressed by Charleton that he personally created him M.D. and made him one of his physicians in ordinary. William Harvey was also there at this time, and there were numerous opportunities for association and for personal and professional stimulation. Charleton had a long professional career. He wrote many books, now mostly forgotten. He was a founder member of the Royal Society. He was a fellow of the Royal College of Physicians and

active in its affairs, being president 1689-91 and giving three Harveian Orations, two of which were published. He had the misfortune, if it can be called one, of living to an old age, outliving most of his contemporaries and patients, and not achieving success with the next generation. He was forced by financial reverses to move from London for several years, but returned to London, dying there in 1707.

But what of Charleton as a bibliophile? He was never a wealthy man, but he did treasure his books. Sloane purchased many of Charleton's books after his death, and these are now in the British Library. Others are in the Royal College of Physicians, and still others have found their way into private collections.

Charleton's books are easily identified; he invariably wrote his name and date of purchase on the title page. And for a physician, he had an unusually fine and legible hand. He kept up well with current medical writing. Of his books that I have seen, the date of acquisition is usually the same as or near to the date of publication. He read his books critically, with pen in hand, not commonly correcting matters of fact but instead errors in spelling and Latinity.¹ One of his books is a bookseller's catalogue, that of Robert Scott, London, 1674, perhaps indicating that a modern vice had ancient beginnings.²

Many of Charleton's copies of his own books, either personal or for presentation, have survived. Lindsay Sharp has shown that Charleton knew John Evelyn at Oxford, and they were fellow members of the Royal Society.³ Evelyn's book collecting habits are well known, having been described by Geoffrey Keynes in his bibliography and more recently with the wide dispersion of the Evelyn books at auction.⁴ Though Charleton lacked Evelyn's financial resources, perhaps Evelyn did have an influence on Charleton's library, as many of Charleton's books are printed on large or fine paper and frequently copies are bound in red or black morocco gilt, either for his own use or for presentation to friends.

Sir Kenelm Digby was a contemporary of Charleton's, though not a physician. I include him for several reasons. He did write books on medicine, chemistry, and the powder of sympathy. He wrote a book covering the then-known physical knowledge of his time as a method of proving the immortality of the soul,⁵ but incidentally, in the process, wrote one of the first defenses in English of Harvey's theory of the circulation of the blood; and on studying his life and personality, one finds he is never boring; sometimes he is a trifle ridiculous, but he is always at the heart of events, always exciting.

But Digby as a bibliophile: as a youth he attended Oxford. Thomas Allen was his tutor there, and his friend. He thought enough of Digby as scholar that at his death he bequeathed him his large and fine collection of manuscripts. Digby had these bound in matching calf, 238 of them,

with his arms on the sides, and placed his name and one of his mottoes in each volume. These were presented by Digby to the Bodleian Library and are still among the treasures there, though some of the bindings have deteriorated.

Digby was an avid collector. Unfortunately, during the Civil War, it is said that most of his early collection was destroyed. He began his collecting again in France, collecting only the finest of printed books and manuscripts, copies frequently on fine or large paper, and he had these bound to his specifications by the French binders in Paris. His books are easy to identify. They are usually in red morocco or tan calf and his arms were stamped on the boards, sometimes combined with those of his wife. His monogram KD or again combined with the V of his wife Venetia were stamped in compartments on the spine and occasionally as added decorations on the sides. The morocco bindings are usually more elaborately decorated than the calf. In books that were already adequately bound, he signed his name and possibly one of his two mottoes on the title page. He had a beautiful italic hand and his signature is easily identified in his books and manuscripts.

Late in his life, in 1665, he was visiting in England. On preparing to return to France, he died suddenly and his library in Paris passed by default to the French king. The books were sold at auction in Paris. Only one copy of this catalogue has survived, and it lacks the title page.⁶ Some of the books stayed in France, but Digby's cousin, the Earl of Bristol, was able to purchase many. On his death, an auction was held of their combined libraries.⁷ Books from Digby's library still occasionally appear in the book market, though most are in institutional collections. Dr. John Fulton formed a fine collection and these are now in the Yale Medical Historical Library. It is tedious but occasionally rewarding to attempt to trace Digby's books through one or both of the auction catalogues.

Skipping over two of the great early eighteenth century bibliophiles, Sir Hans Sloane and Richard Mead, we come to the late eighteenth century and the Quaker physician, John Coakley Lettsom, who begins to exhibit some bibliographical tendencies combined with his bibliophily.

Lettsom was born in the West Indies, the last of eight sets of twins. He was sent to England for his education and to preserve his life from the local endemic fevers and was the only surviving child. He was raised in the family of Samuel Fothergill, brother of John Fothergill, the highly successful London Quaker physician. Partly from the friendship and patronage of Fothergill, Lettsom settled into practice in London. He was active in every philanthropic and worthy project. He was one of the principal founders of the Medical Society of London, Margate Sea-Bathing Infirmary, the General Dispensary in London, the Royal Humane Society, and much more.

Lettsom annotated and indexed everything that he read. He wrote in a letter, "I had no particular predilection for medicine. I never possessed genius; my memory was bad; I made dictionaries and tables of my own invention, to assist memory; I formed indexes of what I read. . . ."⁸ In another letter he wrote, "Success in physic depends more upon judgment than quickness of memory. The first probes to the bottom, the latter skims the surface. I know, where both are combined, the character will become more elevated; but they rarely associate; and the want of memory may be assisted by art. This defect is my lot. I believe I possess industry. I made artificial tables of my own; and, by arrangement and art, I appear to those who know no better, to possess memory. I suppose I have 40,000 notes, which I can refer to." He then wrote further, "Some years since I was desired to deliver an oration at short notice. This I effected by my notes, and my auditory thought I possessed memory in a high degree. . . ."⁹

Lettsom had a large personal library, perhaps 12,000 volumes. These were elegantly housed and carefully arranged in his library at Grove Hill, Camberwell. There were two auction catalogues of his library.¹⁰ The first sale occurred in 1811 after personal financial reverses. The second was in 1816 after his death. Many of his books are in the British Library and others are scattered over the world. His indexing habits are well demonstrated in the copies of his books that survive.

In 1971 I acquired three (of four) volumes of offprints from the *Gentleman's Magazine* from Lettsom's library. These consisted of letters between Lettsom and James Neild regarding prison reform and recount Neild's visits to individual prisons and jails.¹¹ Lettsom had offprints made of the seventy-seven letters, had them interleaved and bound with engraved portraits of Neild and himself, including an original letter from Neild, and in the last volume had compiled an elaborate alphabetical index of all the prisons and other minutiae mentioned in the letters. This, combined with a letter to Jacob Bryant about Bryant's book, *A New System of Ancient Mythology*, gives some idea of how he actually compiled his indexes. He wrote to Bryant, "I was so pleased with this stupendous performance, that I formed a running index to the three volumes, as well as to thy *Observations*, formerly published. . . ."¹² And though Bryant could remember no mention of the god Aesculapius, Lettsom was sure that he could find the examples there were with no problem.

One of the most interesting items in the second sale is lot 703: "TRACTS—A very large and valuable collection of Tracts in five hundred and twenty volumes, on every subject in literature, from 1620 to 1812, with A Manuscript Catalogue, Alphabetically Arranged, by the late Dr. Lettsom." Several years ago while I was browsing through the Lettsom materials at the British Library, it occurred to me that many of

Lettsom's own copies of his writings were located in a segment of the Library's cataloguing system called the tract volumes. After I obtained permission to visit the stack area, it became obvious that these bound volumes of tracts were those of Lettsom described in the sale catalogue. They have been rebound since acquisition and numbered T1 to T479, graded in size from folio (the early numbers) to 16mo. Lettsom's indexes are in the front of most of the volumes and some still contain his book label. His original tract volume number frequently has been changed for the convenience of the library to sort the volumes by size rather than by date of compilation. Lettsom omnivorously gathered every piece of ephemeral literature (sometimes several copies), made indexes, and bound them up in volumes. Immensely interesting materials are included, as for example, Benjamin Waterhouse's thesis, which he presented to Lettsom. Included is a scrap of paper with a note, "This Disputation is intended as the out-lines of a future work, if practice should supply sufficient instances and experience give strength to the several opinions therein contained. B.W."

I have examined roughly a third of these volumes, and the time was well spent. Everything crossing his desk for most of his professional life is included. He had a wide correspondence and his contacts covered Europe and both sides of the Atlantic. Most of his original tract volumes are there, but unfortunately (and the British Library records are missing for this period) his original alphabetical master card index can no longer be found. Lettsom was not a bibliographer in the general sense, but he did have bibliographic and indexing instincts, as shown in his library.

If there was a gold-headed cane for medical book collectors, to be passed from one generation to the next, perhaps the original owner should have been Sir William Osler. He was a virtuoso, in the seventeenth century meaning of the word, collecting widely in all fields and areas in medical history. And he stimulated interest among his colleagues and students (not always easy to do) as he moved from Canada to the United States and finally to England. His volume of scientific work has been superseded, but his biographical, ethical, and historical writings have endured and are highly collected. His great monument (other than Cushing's biography) is the catalogue of his library, the *Bibliotheca Osleriana*. The books were given to McGill University and this year marks the fiftieth anniversary of the Osler Library.

Harvey Cushing should be the next recipient of this hypothetical gold-headed cane. He was born in Cleveland, Ohio, in 1869, and he was to be the fourth generation in this line of physicians. He attended Yale University and Harvard Medical School and took his surgical training at the then new Johns Hopkins Hospital with Halsted. While at Hopkins he acquired (probably from Osler) a strong personal interest in medical

history and book collecting. It was then also that he began his pioneering work in neurosurgery. Among several universities offering professorships, he chose Harvard, becoming professor of surgery there in 1912. One friend said that the Boston Medical Library with its resources was one of the strong magnets attracting Cushing to Boston. He retired to Yale in 1933 and upon his death in 1939 left his very valuable collection of 8,000 books to the Yale Medical Library, convincing several of his friends, including Klebs and Fulton, to do the same. He had very complete collections of Paré, Vesalius, and Culpeper, among others. With the probable stimulus of his young friend, John Fulton, he became involved with bibliography. They compiled together a bibliography of Galvani and Aldini in 1936.¹³

For twenty years Cushing had contemplated publishing a bibliography of Vesalius. According to Fulton, "There had been certain misgivings in Cushing's mind concerning the wisdom of his undertaking a full-length bibliography. He felt that his Latinity was short and that he had had too little first-hand experience with the detail of technical bibliography."¹⁴ In spite of these fears, at his death in October, 1939, the family dining room was littered with materials relating to the Vesalian bibliography. With the editorial help of W. W. Francis and John Fulton, the book was published in a deluxe edition in 1943 on the four hundredth anniversary of the *Fabrica*. Even with all the shortages and exigencies of the war period, the book reflects the taste and technique of the publisher, Mr. Henry Schuman, and of the printer, Mr. A. Colish. The final bibliographical monument to Harvey Cushing is the short-title catalogue of his remarkable library.¹⁵

The next and last recipient of the gold-headed cane should be John Fulton. He was born in St. Paul, Minnesota, in 1899. His studies at the University of Minnesota were interrupted by World War I, and after the war he transferred to Harvard, graduating in 1921. As a Rhodes Scholar, he attended Magdalen College, Oxford. He met Sherrington there and subsequently had the privilege of working in his laboratory at Oxford. He returned to Harvard for medical training. He was so impressed with Cushing's clinical skill and acumen that he resolved to use Cushing's operating room techniques in the physiology laboratory to determine the functions of the nervous system. He maintained a close friendship with Cushing, though his professional career was spent at Yale Medical School, first as Sterling professor of physiology, then as professor of the history of medicine.

Dr. Fulton collected books widely on the history of physiology with an informed knowledge of his subject. He acquired his initial interests while at Oxford; though Sir William Osler had died, Grace Osler and the books were still there. This was reinforced with later contact and friend-

ship with Harvey Cushing. But his great interest in bibliography he acquired, he said, from his friendship and admiration for Geoffrey Keynes.¹⁶

Fulton is probably the premier American physician-collector-bibliographer. His bibliography of Robert Boyle done in 1932 with a second edition in 1961 is a model of its kind.¹⁷ Boyle's books are complex, with additions and cancellations and variant issues, editions, and printings. But Fulton analyzed and dissected them, anatomized them all, and then put them back together again to display both the artistry of Boyle and incidentally to reveal a bit of his own in the process. He also compiled bibliographies of Fracastoro (with Leona Baumgartner),¹⁸ of Servetus (with Madeline Stanton),¹⁹ of Richard Lower and John Mayow,²⁰ as well as of Galvani and Aldini, as mentioned earlier. Fulton acquired a collection of the books of John Howard gathered together by his friend Arnold Muirhead and stimulated Leona Baumgartner to do a fine bibliography of Howard and his writings.²¹ He was working on a bibliography of Joseph Priestley, having done a preliminary checklist,²² and he had projected a *Bibliographica Physiologica* in 1938,²³ but these remain unfinished. His Rosenbach Lectures of 1950, published in 1951 as *The Great Medical Bibliographers*, remain as one of the best introductions to medical bibliography, and still can stimulate the unwary to possible personal involvement in the bibliographic enterprise.

There is no gold-headed cane for Sir Geoffrey Keynes. He is an original, a mutant, a "sport," developing without apparent beginnings and no end in sight. He deserves no gold-headed cane; perhaps a solid gold cane would do instead.

He was born in 1887, the third child of John Neville Keynes, Registrary of the University of Cambridge. His mother was Florence Ada, daughter of the Reverend John Brown of Bedford, the biographer of John Bunyan. She was active in Cambridge when women still did not easily obtain degrees. She was the first woman mayor of Cambridge in 1932, this in the year of her golden wedding anniversary. His older brother was John Maynard, Lord Keynes, the economist, and his sister, Mrs. Margaret Hill, was the wife of Prof. Archibald Vivian Hill, Nobel prizeman.

Geoffrey was educated at Rugby School (classmate of Rupert Brooke), Pembroke College, Cambridge, and St. Bartholomew's Hospital. He served in France in World War I as a medical officer and was Air Vice Marshall in the RAF in World War II.

He married Margaret, daughter of Prof. Sir George Darwin in 1917. He trained at Bart's in the first professorial surgical unit after the war and served there with distinction until his retirement from surgical practice. His surgical achievements were many and include popularizing the intro-

duction of blood transfusion after the war. He was as one of the Hebrew prophets crying in the wilderness when in the late twenties he advocated radium treatment rather than the radical operation for cancer of the breast. And he was the first in England to do thymectomy for myasthenia gravis in the forties. This was rejected at first by some but is now being done for selected cases in many medical centers. And this was in the days without automatic breathing machines and other respiratory paraphernalia taken for granted by us today. He has the major and perhaps unique distinction of belonging as a fellow to all three of the royal colleges of London. These medical accomplishments are only the tip of the iceberg, or perhaps the bottom, depending on your prior knowledge of Geoffrey and exposure to his multifaceted productions. As Lord Brain said at the seventieth birthday celebration in the Great Hall at Bart's, "He has done so much with such distinction in so many fields that the famous schoolboy who once asked 'What are Keats?' could with much more justification inquire 'How many are Keynes?'"²⁴

The many today are to be limited to the one, his accomplishments in bibliography. To many, the word "bibliography" brings the taste of medicine to mind, reminding of the long lists of books required as the addendum to a term paper, the length of the list frequently equated with the quality of the paper. But this is not bibliography, as a few books in a personal library may not be bibliophily. Most of Geoffrey Keynes's bibliographies have been author bibliographies. This type of bibliography had been done before, but he brought the flesh, the blood, the clothing, the jewelry, to ornament the bare bones of bibliography. These books became not only accurate descriptions of the works of individual authors, but filled out details of their lives, their libraries, their associations with printers, publishers, and friends. He says himself, "In each of these books the bibliographical pill is coated with a certain amount of sugar in the form of portraits of the author, examples of his handwriting, and such other illustrations as may have a bearing on the subject. I am also a strong believer in having as many good line-block reproductions of title-pages and other relevant matter as possible. They enliven the pages of the book, are of interest as typographical specimens, and make plain, without further explanation, the plan upon which title-pages have been transcribed. . . . There is another, lower, reason for giving a bibliography these embellishments—they help to sell the book!"²⁵ He might have said that it gives the dry dust of conventional bibliography the breath of life necessary to attract readers and enthusiasts, as one may find out if trying to find some of the early Keynesian bibliographies.

In his presidential address to the Bibliographical Society in 1953 entitled "Religio Bibliographici," he gives his personal bibliographical

credo, the story of his development as a bibliographer, the methods used (some orthodox, others not), and the publishing history of the more important of his bibliographies.²⁶ This should be read completely—it is much too interesting to attempt to paraphrase or condense. His first bibliography, that of John Donne in 1914,²⁷ is out of print in its fourth edition. And still new ones come from the press—most recently of Bishop Henry King;²⁸ soon, perhaps, of Martin Lister; and with luck, Joseph Glanvill, finished and in manuscript for many years. He has done author bibliographies of many. The more noteworthy include William Blake,²⁹ John Evelyn,³⁰ John Donne, Timothie Bright,³¹ William Harvey,³² George Berkeley,³³ Sir Thomas Browne,³⁴ Robert Hooke,³⁵ John Ray,³⁶ Jane Austen,³⁷ William Hazlitt,³⁸ Siegfried Sassoon,³⁹ Rupert Brooke,⁴⁰ and William Pickering.⁴¹ John Fulton in an appendix of *The Great Medical Bibliographers* gave a list in 1951, now sadly incomplete, but still containing some of the most impossible and elusive items for a collector to find.

Geoffrey Keynes's favorite bibliography has always been that of John Evelyn. Mine has been Sir Thomas Browne, and as his Browne library is now at the Royal College of Physicians, it makes possible an analysis of how his bibliographies were compiled. Until recent years, all of his bibliographies were printed by the printer from his handwritten manuscript. His hand is a clear italic, described by his friend and publisher Rupert Hart-Davis as "limpidly legible letters, written in what looked like dried blood."⁴²

The manuscript for the first edition of Sir Thomas Browne is not at the Royal College of Physicians library, but a specially interleaved copy is, with all the corrections, annotations, additions, comments, later findings, and clippings from booksellers' catalogues which were used to produce the second edition of 1968. In addition, there are four scrapbooks made of hand-made paper bound in Cockerel wrappers. One contains twenty-two reviews occurring mostly in British publications and filling forty-one of the forty-eight pages. The other three contain various items: one has primarily cuttings from booksellers' catalogues; another is concerned with the Keynes edition of the Browne *Works* (contract with Faber and Faber, announcements, prospectuses, reviews and notes about other editions of Browne); the last contains other information about Browne, as Simon Wilkin's note about the witchcraft trials, Keynes's note in *TLS* about Elizabeth Lyttleton's commonplace book, etc.

The only major controversy in the Browne bibliography was the change made in the ordering of the two unauthorized editions of 1642, Keynes reversing the commonly accepted order. He subsequently changed his opinion publicly in *TLS*, after many flutterings in the booksellers' dovecotes, but no other major upsets occurred. The second

edition is essential for newer Browne information, but the first is still my favorite—the Emery Walker photogravure for the frontspiece of Sir Thomas and his wife, the Gwen Raverat wood block, the handsome picture of Simon Wilkin with the story of his collected edition, the listing of Edward Browne's writings—all these with the lovely paper on which it is printed, especially if you are fortunate enough to find a copy with intact dust jacket, make the first edition still irreplaceable for any Browne (or Keynesian) addict.

This is just a brief introduction to one of his many bibliographies and bibliography is only a small part of his total scholarly output. His work on William Blake, for example, fills enough volumes to have kept several scholars busy several lifetimes.

And Sir Geoffrey Keynes has been fortunate in his printers and publishers. He has probably had more finely printed books than anyone else in history. These include the Nonesuch Press Books, Oxford and Cambridge University Presses, Curwen Press, Limited Editions Club, David Godine, Bruce Rogers, Stanley Morison, John Henry Nash, John Dreyfus, Simon Rendall, Rampant Lions Press, the long run of publications of the Trianon Press for the William Blake Trust, and others. For the collector, in addition to content, his books have the combined attractions of great beauty and absolute scarcity, some having been printed in as few as twenty-five copies.

A final quotation from Charles Ryskamp, the director of the Pierpont Morgan Library: "The most important part of my education about books took place in the library at Lammas House or in other libraries and bookshops with Geoffrey Keynes. During my time at Cambridge I discovered in his company the special pleasure of learning how a private library is formed to give a full and precise knowledge as well as delight. For the book lover, particularly for the book collector, the best friends are found through books and libraries, and the best conversation is book talk. There is no better place for both than in the small and crowded room in Brinkley which holds the finest books (of course almost every room in the house is in fact a library), drawings, paintings, prints, china and sculpture, and where Geoffrey Keynes is writing or editing five or six books at the same time."⁴³

Notes

1. J. F. Fulton, "A Bibliography of Two Oxford Physiologists, Richard Lower, 1631-1691, John Mayow, 1643-1679," *Oxford Bibliographical Society Proceedings and Papers*, 4 (1935), fig. 2, opp. p. 16, shows Charleton's copy of Lower's *Tractatus de Corde*.

2. R. Scott, *Catalogus Librorum ex Variis Europae Partibus Advectorum* (London, 1674).
3. L. Sharp, "Walter Charleton's Early Life, 1620-1659, and Relationship to Natural Philosophy in Mid-seventeenth Century England," *Annals of Science*, 30 (1973): 311-40.
4. G. Keynes, *John Evelyn; A Study in Bibliophily and a Bibliography of His Writings* (Cambridge: University Press; New York: Grolier Club, 1937); 2d ed. (Oxford: Clarendon Press, 1968); Christie, Manson, and Woods Ltd., *The Evelyn Library . . . Which Will Be Sold at Auction . . .*, 4 pts. (London, 1977-78).
5. K. Digby, *Two Treatises. In the One of Which, the Nature of Bodies; in the Other, the Nature of Man's Soule; Is Looked Into; in Way of Discovery, of the Immortality of Reasonable Soules* (Paris, 1644).
6. The surviving copy is in the Bibliothèque nationale. Lacking the title page, it is undated. There is a photostat at the Yale Medical Library, of which I have a copy.
7. *Bibliotheca Digeiana; sive, Catalogus Librorum . . . Quos post Kenelmum Digeium . . . Possedit . . . Georgius Comes Bristol* [London, 1680].
8. Thomas J. Pettigrew, *Memoirs of the Life and Writings of the Late John Coakley Lettsom*, 3 vols. (London, 1817), 2:60-61.
9. *Ibid.*, pp. 52-53.
10. *A Catalogue of the Greater Portion of the Library of John Coakley Lettsom . . . Which Will Be Sold by Auction, by Leigh and S. Sotheby . . . March 26, 1811* [London, 1811]; *Part Second. A Catalogue of the Medical and Remaining Part of the Library of the Late John Coakley Lettsom . . . Which Will Be Sold by Auction, by Leigh and Sotheby . . . April 3, 1816* [London, 1816].
11. The letters were published in the *Gentleman's Magazine* from 1803 to 1812.
12. Pettigrew, *Memoirs of Lettsom*, 2:173.
13. J. F. Fulton and H. Cushing, "A Bibliographical Study of the Galvani and the Aldini Writings on Animal Electricity," *Annals of Science*, 1 (1936): 239-68.
14. H. Cushing, *A Bio-bibliography of Andreas Vesalius* (New York: Schuman's, 1943), p. vii.
15. *The Harvey Cushing Collection of Books and Manuscripts* (New York: Schuman's, 1943).
16. J. F. Fulton, *The Great Medical Bibliographers: A Study in Humanism* (Philadelphia: University of Pennsylvania Press, 1951), p. 82.
17. J. F. Fulton, "A Bibliography of the Honourable Robert Boyle, Fellow of the Royal Society," *Oxford Bibl. Soc. Proc. Papers*, 3 (1932): 1-172 (also reprinted, Oxford: University Press, 1932); 2d ed. (Oxford: Clarendon Press, 1961).
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19. J. F. Fulton, *Michael Servetus, Humanist and Martyr*, with a bibliography of his works and census of known copies by Madeline E. Stanton (New York: Herbert Reichner, 1953).
20. Fulton, "Bibliography of Lower, Mayow," (above n. 1), pp. 1-62 (also reprinted, Oxford: University Press, 1935).
21. L. Baumgartner, "John Howard (1726-1790) Hospital and Prison Reformer: A Bibliography," *Bulletin of the History of Medicine*, 7 (1939): 486-534, 595-626 (also reprinted, Baltimore: Johns Hopkins Press, 1939).
22. J. F. Fulton and Charlotte H. Peters, *Works of Joseph Priestley, 1733-1804: Preliminary Short Title List* (New Haven, Conn.: Laboratory of Physiology, Yale University School of Medicine, 1937).
23. J. F. Fulton, "A Projected Bibliographica Physiologica," *Bulletin of the Medical Library Association*, 27 (1938): 148-61.
24. Geoffrey Keynes, *Tributes on the Occasion of His Seventieth Birthday with a Bibliographical Checklist of His Publications* (London: Published for the Osler Club by Rupert Hart-Davis, 1961), p. 10.
25. G. Keynes, "Religio Bibliographici," *Library*, 5th ser. 8 (1953): 75.
26. *Ibid.*, pp. 63-76.

27. *Bibliography of the Works of Dr. John Donne, Dean of St. Paul's* (Cambridge: Printed for the Baskerville Club, 1914); *A Bibliography of Dr. John Donne, Dean of Saint Paul's*, 2d ed. (Cambridge: University Press, 1932); 3d ed. (1958); 4th ed. (Oxford: Clarendon Press, 1973).

28. *A Bibliography of Henry King, D.D., Bishop of Chichester* (London: Douglas Cleverdon, 1977). First issued in *The Poems of Bishop Henry King*, ed. John Sparrow (London: Nonesuch Press, 1925), pp. 187-92.

29. *A Bibliography of William Blake* (New York: Grolier Club, 1921).

30. See above, n. 4.

31. *Dr. Timothie Bright, 1550-1615; A Survey of His Life with a Bibliography of His Writings* (London: Wellcome Historical Medical Library, 1962).

32. *A Bibliography of the Writings of William Harvey, M.D., Discoverer of the Circulation of the Blood* (Cambridge: University Press, 1928); *A Bibliography of the Writings of Dr. William Harvey, 1573-1657*, 2d ed. rev. (Cambridge: University Press, 1953); also issued with a cancel title page correcting the birth date to 1578.

33. *A Bibliography of George Berkeley, Bishop of Cloyne; His Works and His Critics in the Eighteenth Century* (Oxford: Clarendon Press, 1976).

34. *A Bibliography of Sir Thomas Browne, Kt., M.D.* (Cambridge: University Press, 1924); 2d ed. rev. and augm. (Oxford: Clarendon Press, 1968).

35. *A Bibliography of Dr. Robert Hooke* (Oxford: Clarendon Press, 1960).

36. *John Ray; A Bibliography* (London: Faber and Faber, 1951); *John Ray, 1627-1705; A Bibliography, 1660-1970*, [2d ed.] (Amsterdam: G. Th. van Heusden, 1976).

37. *Jane Austen; A Bibliography* (London: Nonesuch Press, 1929).

38. *Bibliography of William Hazlitt* (London: Nonesuch Press, 1931).

39. *A Bibliography of Siegfried Sassoon* (London: Rupert Hart-Davis, 1962).

40. *A Bibliography of Rupert Brooke* (London: Rupert Hart-Davis, 1954); 2d ed. (1959); 3d ed. (1964).

41. *William Pickering, Publisher; A Memoir and a Hand-list of His Editions* (London: The Fleuron, 1924); *William Pickering, Publisher; A Memoir and a Check-list of His Publications*, rev. ed. (London: Galahad Press, 1969).

42. R. Hart-Davis, "A Little Injudicious Levity," in *To Geoffrey Keynes; Articles Contributed to "The Book Collector" to Commemorate His Eighty-fifth Birthday* (London: Book Collector, 1972), p. 17.

43. C. Ryskamp, "William Collins's *Poem to the Prince of Orange*," in *ibid.*, p. 80.

The Physician as Scholar

Saul Jarcho

Since the *Index Medicus* and its massive companion the *Index-Catalogue* have been regarded as constituting jointly one of our country's greatest contributions to medicine and stand also as one of our country's greatest contributions to scholarship, it is appropriate on the present centennial occasion to consider some of the relations between these two realms of activity. We may properly ask, "What is scholarship?" and "What if any is its place in medicine?" The inclusion of the words "if any" in the second of these questions is necessary if we are to maintain vigilant self-criticism.

While scholarship has been practiced in the Orient for countless centuries and has great achievements to its credit, such as the Chinese annals and Panini's Sanskrit grammar, the present Western concept is clearly related not to these but to the work of rhetoricians in Sicily, in Athens, and subsequently in Alexandria. Physicians will be especially delighted to note that in antiquity the island of Cos not only was famous for medicine but harbored also a brotherhood of poets and was a favorite retreat for men of letters.¹ This was before it became one of the Mayo Clinics of the Roman Empire.

The achievements of the ancient Greeks have imprinted on our minds the concept that scholarship is concerned with literature, with classics, with antiquity, and with ancient languages. Viewed in this way, scholarship is *classical* scholarship—the exact, thorough, and systematic study of the languages and literatures of the ancient Greeks, Romans, and Hebrews. These restrictions of subject matter have been transcended, with the result that the term scholarship is now applied to literature of all eras and all languages, to history, and to the arts. Since the widening of scope has been accompanied by no decline or deterioration in standards, the best scholarship continues to imply mastery obtained through systematic, minute, accurate, and specialized application.²

The work of the scholar is usually conducted in the library and the study. It is as far as possible objective and ideally shows little of the subjective character that is permissible or even essential in the writings of men of letters. Both the scholar and the man of letters employ the critical faculty, but in somewhat different ways.

Between scholarship and the natural sciences the resemblances are large. In both realms research is motivated by the desire for knowledge and understanding, a desire that is characteristic of the inquiring mind and that manifests itself by the detection, collection, evaluation, and orderly arrangement of facts, which may form the basis of inferences and which—much less often—may form the basis of generalizations or even theories. These processes may be assisted by strictly disciplined use of imaginative anticipation and on occasion may be enlightened by flashes of insight. Whatever the procedure by which data are acquired and used, and whatever the way in which concepts are formed, the fundamental criterion is conformity to fact, i.e. truth.

To the degree that scholarship, especially historical scholarship, deals with that which is unique, verification may be impossible. It is at this point that the natural sciences, especially the experimental sciences, enjoy the clear and satisfying advantage of access to repeated observation.

Until recent decades one of the chief characteristics of the natural sciences, namely measurement, did not enter the realm of scholarship to any significant extent. The advent of cliometry, the measurement of historical processes, has now begun to produce changes, the extent and importance of which cannot be gauged at present.

From the natural scientist we may turn to consider the physician. In the Western world the concept of the physician as a learned man goes back at least to the Middle Ages. In *The Canterbury Tales* Geoffrey Chaucer tells us that the *doctour of phisyk* knew astrology and knew the properties of drugs, but to those who read the description it is obvious that the doctor's most conspicuous trait was book-learning. Chaucer lists fifteen authors, ancient and medieval, whose writings the *doctour* knew well, presumably in Latin editions.³ The physician, clearly, was a learned man and was distinguished from other professional men, such as lawyers and the clergy, more by the subject matter of his reading than by any other characteristic of his indoctrination.

It is worth noticing, at the same time, that not one of the fifteen authors whom the doctor knew well was nonmedical. There is no mention of Aristotle or Homer or Cicero or Virgil. We might therefore feel impelled to conclude that the doctor's background was specialized, technical, and nonhumanistic, especially since Chaucer cleverly remarks that the doctor's reading "was but litel on the Bible." But an alternative possibility cannot be excluded. Chaucer and his medieval readers may have *assumed* that the physician had had a fundamental humanistic schooling, hence this did not need to be mentioned.

The physician's reputation as a man of learning and as the member of a learned profession clung to him through the eighteenth century,

when ancient writings ceased to be a major component of the medical curriculum, and through the nineteenth and twentieth centuries, when old writings were less and less often consulted and the ability to read Greek and Latin dwindled almost to extinction. With the advent of the pedagogic cancer that is known as premedical education—which is not education but technical training—the student has been debarred from any significant contact with humane letters. Moreover, his preparatory studies in chemistry, physics, and zoology, important and necessary as they are, lean toward technology rather than enlightenment and are not brought into relation with the deeper concerns of the human mind. In a course in zoology what does the premedical student learn about death?

We come now to consider the place of scholarship in medicine. It is obvious that medicine, the natural sciences, and scholarship have in common a large procedural element, namely the collection and objective judgment of data and the formation of correct inferences. This aspect I have already mentioned.

The principal task of the medical scholar goes far beyond details of procedure. It arises from the desire to understand medicine and its relation to other components of the cosmos. One method of understanding any entity, and this applies to human beings, their artifacts, institutions, ideas, and problems, consists of ascertaining what it was like at a previous time. This is the historical method; its application is a prime function of scholarship. Inevitably, the study of the history of medicine is the principal field of scholarly activity in medicine.

The methods and achievements of medical scholars can be illustrated best by reference to specific examples. Let us start by considering Emile Littré (1801–81).⁴

Littré studied medicine in Paris under Andral, Rayer, and Bouillaud. Although he served an internship, he never completed the formal requirements for the medical degree. He practiced medicine on a small scale in the obscure village of Mesnil. His knowledge of medicine was very much greater than this would suggest.

Littré gained fame as an essayist, as a journalist, as author of a five-volume dictionary of the French language (1863–72), and as the great editor of Hippocrates.

His edition of Hippocrates in ten bilingual volumes was published between 1839 and 1861⁵ and was based on a collation which represented the readings in seventy manuscripts. By meticulous study of this material Littré was able to detect and rectify innumerable errors—misspellings, transpositions, conflations, and omissions—which scribal ignorance, incapacity, or inattention had produced. He was able to determine which texts were probably genuine and which were spurious. In the national library of France he discovered a Latin translation of a Hippocratic

treatise of which the Greek original had been lost, and he established its genuineness.⁶

By these efforts he founded the modern tradition of the textual knowledge of Hippocrates. But his contribution was greater than this. He was able to show that medicine existed in Greece long before the time of Hippocrates. He to a great extent ascertained which doctrines were held by the Hippocratic school. He was able to recognize that some of the puzzling fevers mentioned in the Hippocratic writings were the endemic intermittent fevers of southern Europe and that these had been puzzling because northern European notions of fever had been applied to them.⁷

Whereas Hippocrates had been regarded previously as nonexistent or as a mysterious demigod, the semidivine father of medicine, heroic in combat against the Athenian plague, and virtuous in the rejection of royal gifts, Littré by careful critical analysis established Hippocrates as a genuine and credible person and he set the foundations for a correct appreciation of the Hippocratic corpus. Thus he rescued for us an important part of our heritage and made it possible for us to begin to understand it. He stated in his preface, "My intention has been to place the Hippocratic writings completely at the disposal of the physicians of our time and I have wanted it to be possible for them to be read and understood like a contemporary book."⁸

Littré's research on Hippocrates has two aspects that require special mention. The first is the work of the medical historical scholar in discovering, rescuing, and preserving the past. It differs in no essential way from work done in other fields, such as the achievement of Wolfgang Graeser (1906–28), the Swiss mathematician and philologist who rearranged Johann Sebastian Bach's *Art of the Fugue*,⁹ or the work of Felix Mendelssohn, who rediscovered Bach's choral music, or the massive work of Jaroslav Pelikan on the history of Christian doctrine.¹⁰

Beyond the scholarly service of discovery and restoration lie the services of analysis and explanation. Littré accomplished the latter by very wide study of ancient writings. This made it possible for him not merely to restore the Hippocratic texts in the sense that he produced corrected versions, but he also restored them to intelligibility and made them part of a rational heritage, understood with reference to earlier and later stages of knowledge.

Littré's work on Hippocrates, like all else, takes its place in the course of historical development. A noted later scholar made the following comment:

The first scholarly edition was that of Littré, and only those who have seriously studied the works of Hippocrates can appreciate the debt we owe to his diligence. . . . Unfortunately Littré is diffuse, and not always accurate. His opinions, too, changed during the long period of preparation, and the

additional notes in the later volumes must be consulted in order to correct the views expressed in the earlier.

As a textual critic he shows much common sense, but his notes are awkward to read, and his knowledge was practically confined to the Paris MSS.

He is at his best as a medical commentator. . . .¹¹

The scholarly study of Hippocrates continues, in Europe and in America. We may note especially the volumes published by Teubner of Leipzig under the editorship of Heiberg, Kuehlewein, Deichgräber, and others,¹² and the Loeb Library Hippocrates,¹³ recently revived with the help of the National Library of Medicine.

It is no derogation to say that the scholarly work of Littré stands apart from the main scientific current of medical development. We may contrast him with several men, now to be considered, whose work contributed directly and importantly to that development in its most fundamental aspects. Let us turn first to Morgagni.

In a long lifetime Giovanni Battista Morgagni (1682-1771) produced several substantial anatomical treatises, the great and massive *De Sedibus*, eight letters on Celsus, and a variety of archeological, medicolegal, and miscellaneous essays. In addition he left a large quantity of manuscript material, which was rediscovered in 1952 and was subsequently published in five quarto volumes.¹⁴

I shall limit the present discussion to the *De Sedibus*, a series of seventy long letters in which Morgagni reported his effort, by systematic dissection and careful clinicoanatomical correlation, to determine the anatomical location of symptoms, arranged in the ancient order from head to feet. In this vast treatise the most famous letters deal with vascular lesions, especially aortic aneurysms. Since Morgagni arranged his text according to symptoms and not according to lesions, he considered aneurysms which interfere with respiration separately from aneurysms which cause sudden death. The former are discussed in letter seventeen, the latter in letters twenty-six and twenty-seven. Any modern physician, whatever his specialty, may read these passages with interest and pleasure.¹⁵ We may paraphrase Morgagni's contemporary Dr. Samuel Johnson by remarking that whoever is tired of Morgagni is tired of life.

In taking up any symptom, Morgagni usually presented autopsied cases found in the records of his teacher Valsalva and then cases found in his own files.¹⁶ Especially in the more elaborate letters, the discussion is accompanied by thorough analysis of the literature and is copiously and accurately footnoted. The range of citations is impressive. For example in letter seventeen, which "Treats of Respiration being injur'd from Aneurisms of the Heart, or the Aorta, within the Thorax," there are forty

citations in the five introductory paragraphs. Two of these citations, being accompanied by references in the text, are not footnoted. Three others refer to other parts of the *De Sedibus*. The remaining thirty-five footnoted references range from ancient authors such as Hippocrates and Aetius to more recent authors such as Paré, Bonetus, and Lancisi. Included with these are allusions to thoroughly forgotten worthies such as Carolus Stephanus (1504–64), Joannes Formagius, and Joachimus Georgius Elsnerus (1642–76), not all of whom can even be found in the *Index-Catalogue*.

Skeptics, a breed of men whom we welcome only when they do not ask annoying questions, may well inquire whether there is any value in Morgagni's accumulated citations. To this question letter seventeen provides a conclusive answer.

Morgagni shows that the ancient medical literature contains not one mention of aortic aneurysm and that cases of this kind did not appear in extant records before the sixteenth century. Further, he concurs with a remark of Lancisi that all ancient and medieval reports, such as those of Galen and Avicenna, refer only to aneurysms of the peripheral arteries.

The observation that aortic aneurysm was unreported in antiquity has stood the test of time as well as any negative statement can. It has tended to be overlooked in recent writing on the origins of syphilis, but in my opinion it embodies information of high importance, not to be explained away or belittled.¹⁷

Morgagni's scholarly analysis of the literature of aneurysm added the valuable dimension of time to our understanding of the lesion and of the disease that causes it. Other letters deal with apoplexy;¹⁸ these combined literary scholarship with anatomical study in such a way as to define the clinical and anatomical concept of apoplexy and to shake the inherited belief in a form of apoplexy attributed to serous effusions in the head. In both instances, that of aortic aneurysm and that of apoplexy, scholarly analysis produced clear contributions to the understanding of disease.

Morgagni's contemporary Albrecht von Haller (1708–77) studied medicine under Boerhaave, anatomy under Albinus, and mathematics under Jean Bernoulli I. The leading physiologist of the eighteenth century, he was also a medical practitioner, a public official, a famous professor, a famous systematic botanist, a noted poet, and an eminent bibliographer.

In the present context it is unnecessary to describe Haller's work on embryology, or his research on the anatomy and physiology of the heart, or his role as a founder of hemodynamics and of neurophysiology. Let us consider instead his remarkable contribution to a specialized form of scholarship, namely bibliography.

In any extensive study of the development of medical bibliography, Haller ranks among the foremost, his eminence in this field being fully comparable to his eminence in physiology. According to an anecdote recounted by Dr. Estelle Brodman, Haller as a young student at the unsatisfactory University of Tübingen heard his professor reading Boerhaave's authoritative textbook, the *Institutiones Medicae*, to the class. Haller thereupon took the notion of going to Leyden in order to study with Boerhaave directly.¹⁹ I think we can see in this an early manifestation of Haller's relentless drive to go to the source and to reach the fundamentals of any subject he studied.

At this time, while in Leyden, Haller began the prodigious labors of reading, abstracting, annotating, and commenting, which later were accompanied by his laboratory investigations and which are apparent in his extensive treatises on physiology, making them a greatly appreciated reservoir of information.

Haller's bibliographic creativity flowered in four massive special treatises, the *Bibliotheca Anatomica*, and analogous works on surgery, botany, and practical medicine. These appeared between 1771 and 1778 in ten quarto volumes. Each work is a complete study and each one includes in its title the important words *a rerum initiis*, signifying that each subject has been traced from the beginning of the record. The total ten-volume contribution is estimated to contain 52,000 entries. A large part of this material is based on 9,300 book reviews which Haller contributed to periodicals and on a huge number of annotated summaries that he had made for his files.²⁰ The entries not only present the expected citations but quite often include a summary of the contents, a critique, and much incidental information, some of which was based on Haller's original observations, made in the laboratory or elsewhere. As a result the reader who studies the entry on Harvey or that on Malpighi is rewarded with exact information amplified by a detailed personal appreciation of the man, his difficulties, and his achievements.²¹ Our all-enveloping computers have yet to reach this level of virtuosity. As the very human John Fulton pointed out, Haller humanized bibliography.²²

In a more elaborate discourse than is possible on the present occasion it would have been appropriate to discuss in detail the work of Rudolph Virchow, who ranks with Morgagni and Haller as one of the greatest men of medicine. Like them, he lived long, worked endlessly, and wrote copiously. Prof. Erwin Ackerknecht has pointed out that early in his life Virchow showed a marked inclination toward historical research and composed three essays on the history of his home town, Schivelbein, in Pomerania.²³ In this way he went back to his own roots.

It is evident that, like Morgagni and Haller, Virchow felt constantly driven to study each subject with reference to its origins and in its

historical development. In this way he amplified his laboratory observations by adding the historical dimension, as is clearly apparent, for example, in his anatomical research on syphilis²⁴ and on tuberculosis.²⁵ In addition he prepared special studies on special subjects, such as the history of leprosy²⁶ and the history of hospitals.²⁷ The same scholarly insight that enabled Virchow to know the medicine of his time and to understand it in depth, he likewise applied to public health and to politics.

Having considered the scholarship of great physicians—Morgagni, Haller, and Virchow—we may well ask, as Hamlet did, “What’s he to Hecuba?” What bearing have the scholarly accomplishments of famous medical scholars on the daily doings of the ordinary student and the ordinary physician?

In the most general terms the great men whom we have been considering exemplify the desire to learn, the impulse to inquire, and the drive to ascertain by study of original sources of information, whether these be in the living animal, the cadaver, the test tube, or the written record. For those physicians who do the vital work that we belittle under the designation of *routine*, and who make no pretensions toward what we glorify with the name of *research*, the paths of inquiry are constantly open and are well worn, because each new case encountered in the physician’s routine practice involves or implies an investigation, however simple or familiar. Striking confirmation of this statement is provided by the practitioner’s most valuable routine procedure, the taking of the clinical history. Here the purpose is to ascertain the nature and causes of a condition by reference to the manner in which it arose and developed. In this truly historical inquiry the physician consults the source of information, i.e. the patient or his best informed representative. The facts are rapidly gathered, preferably in chronological order. They are rapidly weighed and preliminary judgments of their importance are made *pari passu*. At the same time an explanatory hypothesis, the working diagnosis, is being formed. The assembled facts are subjected to corroboration by physical and laboratory examination, and the hypothesis may undergo repeated revision.

In pursuing this procedure, the obscure inquirer at the bedside earns again and again his place of honor among his famous colleagues whose names are nowadays being transferred from obsolete card catalogues to obsolescent computers. We are justified in maintaining that a congener of the scholarly attitude is alive, however unobtrusively and unpretentiously, at the bedside and in the clinic, and that in the practice of medicine an activity closely akin to scholarship is an essential ingredient.

Notes

1. John Edwin Sandys, *A History of Classical Scholarship*, 3d ed. (1920; reprint ed., New York: Hafner Publishing Co., 1967), 1:105-66.
2. I have here followed the definition of scholar in *Webster's New International Dictionary*, 2d ed.
3. Chaucer, *The Canterbury Tales*, A 411-44.
4. Georges Daremberg, *Les Grands médecins du XIXe siècle* (Paris: Masson, 1907), pp. 173-249; L. Guinet, "Emile Littré (1801-1881)," *Isis*, 8 (1926): 77-102.
5. E. Littré, ed. and trans., *Oeuvres complètes d'Hippocrate*, 10 vols. (Paris, 1839-61).
6. *Ibid.*, 1:384-410.
7. W. H. S. Jones makes the following astute observation: "It is curious to note that Hippocrates was a medical text-book almost down to the time (about 1840) when malaria ceased to be a real danger to northern Europe." W. H. S. Jones and E. T. Withington, eds. and trans., *Hippocrates*, Loeb Classical Library, 4 vols. (London: William Heinemann, 1923-31), 1:lxviii-lxix.
8. Littré, *Oeuvres d'Hippocrate*, 1:ix.
9. W. Graeser, "Bachs 'Kunst der Fuge,'" *Bach-Jahrbuch*, 21 (1924): 1-104; *idem*, *Joh[ann] Seb[astian] Bachs Werke. Die Kunst der Fuge 1750* (Leipzig: Breitkopf und Hartel, 1927). I thank Mr. Wayne D. Shirley of the Music Division, Library of Congress, for information about Wolfgang Graeser.
10. J. Pelikan, *The Christian Tradition; A History of the Development of Doctrine* (Chicago: University of Chicago Press, 1971-).
11. Jones and Withington, *Hippocrates*, 1:lxviii.
12. For example, I. L. Heiberg et al., eds., *Hippocratis Opera*, *Corpus Medicorum Graecorum*, vol. 1 (Leipzig, B. G. Teubner, 1927-); Hugo Kuehlewein, ed., *Hippocratis Opera Quae Feruntur Omnia*, 2 vols. (Leipzig, B. G. Teubner, 1894-1902); Karl Deichgräber, ed. and trans., *Hippokrates Über Entstehung und Aufbau des menschlichen Körpers* (Leipzig, B. G. Teubner, 1935).
13. See above, n. 7. Vols. 5 and 6 are now in preparation.
14. G. B. Morgagni, *Opera Postuma*, 5 vols. (Rome: Istituto di Storia della Medicina dell'Università di Roma, 1964-77).
15. The English translation, *The Seats and Causes of Diseases Investigated by Anatomy* (London, 1769), written in the dignified prose of Benjamin Alexander, has been reissued in facsimile under the auspices of the New York Academy of Medicine and adorned with a preface by the late Dr. Paul Klemperer (3 vols.; New York: Hafner, 1960). Plans are afoot to reissue this facsimile, which is out of print.
16. Morgagni's procedure is discussed from a different point of view in S. Jarcho, "Morgagni, Vicarius, and the Difficulty of Clinical Diagnosis," in L. G. Stevenson and R. P. Multhauf, eds., *Medicine, Science, and Culture; Historical Essays in Honor of Owsei Temkin* (Baltimore: Johns Hopkins Press, 1968), pp. 87-95.
17. Morgagni's observation must be used with care. Like Lancisi, Morgagni included enlargement of the heart and enlargement of single cardiac chambers under the designation aneurysm. This is evident in the reports of Massa (generalized cardiac enlargement), Vesalius (enlargement of the left ventricle), and Stephanus (enlargement of the right atrium), cited in letter 17, par. 2. Can we believe that cardiac enlargement did not occur in antiquity?
18. Letters 2-6.
19. E. Brodman, *The Development of Medical Bibliography* (Baltimore: Medical Library Association, 1954), pp. 66-67. The source of the story is the autobiography which Haller included in his *Bibliotheca Anatomica*, 2 vols. (1774-77; reprint ed., Hildesheim: G. Olms, 1969), 2:195.
20. These estimates are given by Gunter Mann in his preface to Haller, *Bibliotheca Anatomica* (reprint ed., 1969), 1:x.
21. *Ibid.*, pp. 363-66, 486-90.

22. J. F. Fulton, "Haller and the Humanization of Bibliography," *New England Journal of Medicine*, 206 (1932): 323-28.

23. E. Ackerknecht, *Rudolph Virchow: Doctor, Statesman, Anthropologist* (Madison: University of Wisconsin Press, 1953), p. 7. Ackerknecht cites *Drei historische Arbeiten Virchows zur Geschichte seiner Vaterstadt Schivelbein* (Berlin, 1903); I have not had access to this work. On Virchow as a medical historian, see pp. 146-55.

24. R. Virchow, "Ueber die Natur der constitutionell-syphilitischen Affectionen," *Archiv für pathologische Anatomie und Physiologie und für klinische Medicin*, 15 (1858): 217-335.

25. R. Virchow, "Phymatie, Tuberculose und Granulie. Eine historisch-kritische Untersuchung," *ibid.*, 34 (1865): 11-73.

26. R. Virchow, "Zur Geschichte des Aussatzes," *ibid.*, 18 (1860): 138-62, 273-329; 19 (1860): 43-93; 20 (1861): 166-98, 459-512.

27. R. Virchow, *Gesammelte Abhandlungen aus dem Gebiete der öffentlichen Medicin und der Seuchenlehre*, 2 vols. (Berlin, 1879), 2:6-87.

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